DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

WATER-SUPPLY PAPER 440

SURFACE WATER SUPPLY OF THE UNITED STATES

1916

PART X. THE GREAT BASIN

NATHAN C. GROVER, Chief Hydraulic Engineer
E. A. PORTER, C. C. JACOB, H. D. McGLASHAN, F. F. HENSHAW, G. C. BALDWIN,
and ROBERT FOLLANSBEE, District Engineers

Prepared in cooperation with the States of
UTAH, NEVADA, CALIFORNIA, OREGON, AND WYOMING

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Water Resources Branch,
Geological Survey,
Box 3106, Capitol Station
Oklahoma City, Okla.

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SURFACE WATER SUPPLY OF THE GREAT BASIN, 1916.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting records or measurements of flow made on streams in the United States during the year ending September 30, 1916.

The data presented in these reports were collected by the United States Geological Survey under the following authority contained in the organic law (20 Stat. L., p. 394):

> *Provided,* That this officer [the Director] shall have the direction of the Geological Survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

The work was begun in 1888 in connection with special studies relating to irrigation in the arid West. Since the fiscal year ending June 30, 1895, successive sundry civil bills passed by Congress have carried the following item and appropriations:

> For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

Annual appropriations for the fiscal years ending June 30, 1895–1917.

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100,000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911 to 1917, inclusive	150,000

In the execution of the work many private and State organizations have cooperated either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 16.

Measurements of stream flow have been made at about 4,100 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1916, 1,290 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements are made at other points.

In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in water-supply papers from time to time. Information in regard to publications relating to water resources is presented in the appendix to this report.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those that represent a rate of flow, as second-feet, gallons per minute, miner's inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in depth in inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, and acre-feet. They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents (p. 11).

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off (depth in inches)" is the depth to which an area would be covered if all the water flowing from it in a given period were uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth in inches.

An "acre-foot," equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

The following terms not in common use are here defined:

"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," a term used to designate the section or sections of the stream channel below the gage which determines the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a gaging station is that point on the gage—the gage height—to which the surface of the river falls when the discharge is reduced to zero.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations:

Table for converting discharge in second-feet per square mile into run-off in depth in inches over the area.

Discharge (second-feet per square mile).	Run-off in inches.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.03719	1.041	1.079	1.116	1.153
2	.07438	2.083	2.157	2.231	2.306
3	.11157	3.124	3.236	3.347	3.459
4	.14876	4.165	4.314	4.463	4.612
5	.18595	5.207	5.393	5.578	5.764
6	.22314	6.248	6.471	6.694	6.917
7	.26033	7.289	7.550	7.810	8.070
8	.29752	8.331	8.628	8.926	9.223
9	.33471	9.372	9.707	10.041	10.376

Note.—For a part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in acre-feet.

Discharge (second-feet).	Run-off in acre-feet.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	1.983	55.54	57.52	59.50	61.49
2	3.967	111.1	115.0	119.0	123.0
3	5.950	166.6	172.6	178.5	184.5
4	7.934	222.1	230.1	238.0	246.0
5	9.917	277.7	287.6	297.5	307.4
6	11.90	333.2	345.1	357.0	368.9
7	13.88	388.8	402.6	416.5	430.4
8	15.87	444.3	460.2	476.0	491.9
9	17.85	499.8	517.7	535.5	553.4

Note.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of cubic feet.

Discharge (second-feet).	Run-off in millions of cubic feet.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.0864	2.419	2.506	2.592	2.678
2	.1728	4.838	5.012	5.184	5.356
3	.2592	7.257	7.518	7.776	8.034
4	.3456	9.676	10.02	10.37	10.71
5	.4320	12.10	12.53	12.96	13.39
6	.5184	14.51	15.04	15.55	16.07
7	.6048	16.93	17.54	18.14	18.75
8	.6912	19.35	20.05	20.74	21.42
9	.7776	21.77	22.55	23.33	24.10

Note.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of gallons.

Discharge (second-feet).	Run-off (millions of gallons).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.6463	18.10	18.74	19.39	20.04
2	1.293	36.20	37.48	38.78	40.08
3	1.939	54.30	56.22	58.17	60.12
4	2.585	72.40	74.96	77.56	80.16
5	3.232	90.50	93.70	96.95	100.2
6	3.878	108.6	112.4	116.3	120.2
7	4.524	126.7	131.2	135.7	140.3
8	5.171	144.8	149.9	155.1	160.3
9	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting velocity in feet per second into velocity in miles per hour.

[1 foot per second=0.681818 mile per hour, or two-thirds mile per hour, very nearly; 1 mile per hour=1.4666 feet per second. In computing the table the figures 0.68182 and 1.4667 were used.]

Feet per second (units).	Miles per hour for tenths of foot per second.									
	0	1	2	3	4	5	6	7	8	9
0	0.000	0.068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1	.682	.750	.818	.886	.995	1.02	1.09	1.16	1.23	1.30
2	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

Table for converting discharge in second-feet into theoretical horsepower per foot of fall.

[1 second-foot=0.1136 theoretical horsepower per foot of fall. Weight of 1 cubic foot of water=62.5 pounds.]

Tens.	Units.									
	0	1	2	3	4	5	6	7	8	9
0	0.00	0.114	0.227	0.341	0.454	0.568	0.682	0.795	0.909	1.02
1	1.14	1.25	1.36	1.48	1.59	1.70	1.82	1.93	2.04	2.16
2	2.27	2.39	2.50	2.61	2.73	2.84	2.95	3.07	3.18	3.29
3	3.41	3.52	3.64	3.75	3.86	3.98	4.09	4.20	4.32	4.43
4	4.54	4.66	4.77	4.88	5.00	5.11	5.23	5.34	5.45	5.57
5	5.68	5.79	5.91	6.02	6.13	6.25	6.36	6.48	6.59	6.70
6	6.82	6.93	7.04	7.16	7.27	7.38	7.50	7.61	7.72	7.84
7	7.95	8.07	8.18	8.29	8.41	8.52	8.63	8.75	8.86	8.97
8	9.09	9.20	9.32	9.43	9.54	9.66	9.77	9.88	10.0	10.1
9	10.2	10.3	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2

1 second-foot equals 40 California miner's inches (law of March 23, 1901).

1 second-foot equals 38.4 Colorado miner's inches.

1 second-foot equals 40 Arizona miner's inches.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.

1 second-foot for one year (365 days) covers 1 square mile 1.131 feet or 13.572 inches deep.

1 second-foot for one year (365 days) equals 31,536,000 cubic feet.

1 second-foot equals about 1 acre-inch per hour.

1 second-foot for one day equals 86,400 cubic feet.
1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.
1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.
1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.
1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.
1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.
100 California miner's inches equals 18.7 United States gallons per second.
100 California miner's inches for one day equals 4.96 acre-feet.
100 Colorado miner's inches equals 2.60 second-feet.
100 Colorado miner's inches equals 19.5 United States gallons per second.
100 Colorado miner's inches for one day equals 5.17 acre-feet.
100 United States gallons per minute equals 0.223 second-foot.
100 United States gallons per minute for one day equals 0.442 acre-foot.
1,000,000 United States gallons per day equals 1.55 second-feet.
1,000,000 United States gallons equals 3.07 acre-feet.
1,000,000 cubic feet equals 22.95 acre-feet.
1 acre-foot equals 325,850 gallons.
1 inch deep on 1 square mile equals 2,323,200 cubic feet.
1 inch deep on 1 square mile equals 0.0737 second-foot per year.
1 foot equals 0.3048 meter.
1 mile equals 1.60935 kilometers.
1 mile equals 5,280 feet.
1 acre equals 0.4047 hectare.
1 acre equals 43,560 square feet.
1 acre equals 209 feet square, nearly.
1 square mile equals 2.59 square kilometers.
1 cubic foot equals 0.0283 cubic meter.
1 cubic foot of water weighs 62.5 pounds.
1 cubic meter per minute equals 0.5886 second-foot.
1 horsepower equals 550 foot-pounds per second.
1 horsepower equals 76.0 kilogram-meters per second.
1 horsepower equals 746 watts.
1 horsepower equals 1 second-foot falling 8.80 feet.
1⅓ horsepower equals about 1 kilowatt.

To calculate water power quickly: $\frac{\text{Sec.-ft.}\times\text{fall in feet}}{11}$ =net horsepower on water wheel realizing 80 per cent of theoretical power.

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1915, and ending September 30, 1916. At the first of January in most parts of the United States much of the precipitation in the preceding three months is stored as ground water, in the form of snow, or in ponds, lakes, and swamps, and this stored water passes off in the streams during the spring break-up; at the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for a year beginning October 1 is practically all derived from precipitation within that year.

The base data collected at gaging stations (Pl. I, *B*) consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder (Pl. II) that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter by the general methods outlined in standard textbooks on the measurement of river discharge.

From the discharge measurements, rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to the gage heights, give the daily discharge from which the monthly and yearly means of discharge are determined

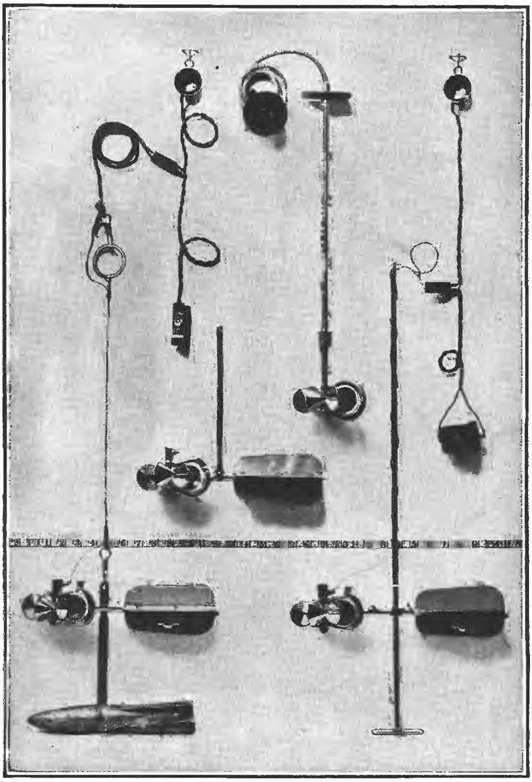
The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving records of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off

If the base data are insufficient to determine the daily discharge, tables giving daily gage height and records of discharge measurements. are published.

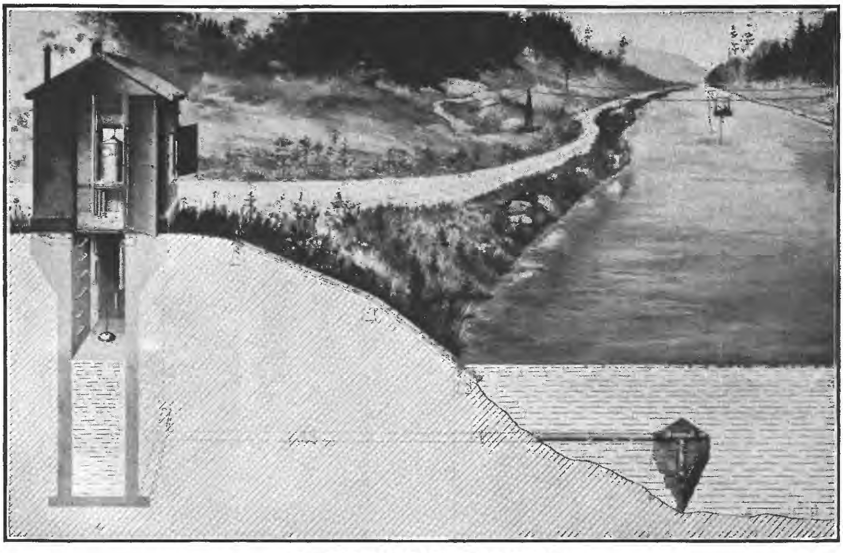
The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the permanence of the stage-discharge relation covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of channel, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge gives, in general, the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders the mean daily discharge is obtained by averaging the discharge at regular intervals during the day or by use of the discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

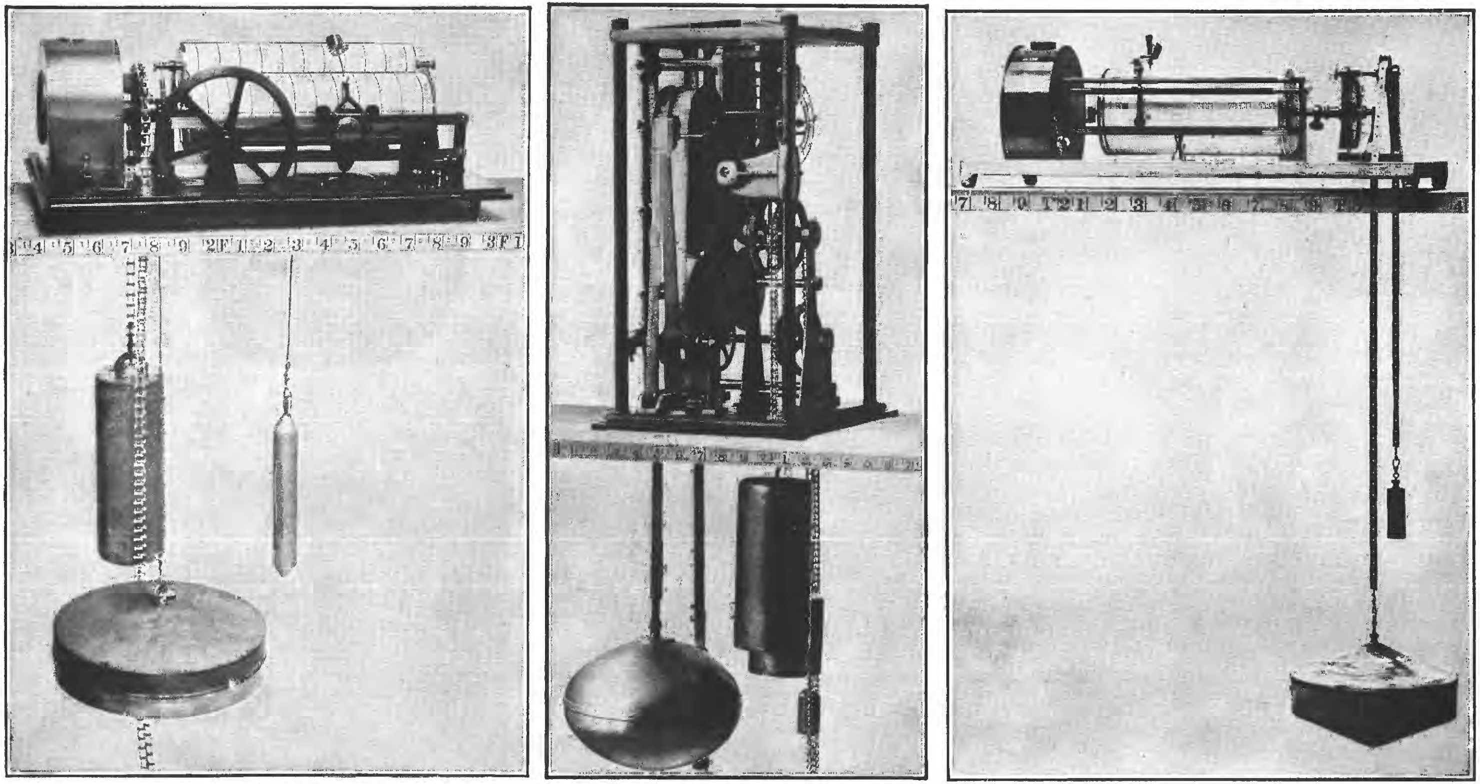
In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day, it does not indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column headed "Minimum" the quantity given is the mean flow for the day when



A. PRICE CURRENT METERS.



B. TYPICAL GAGING STATION.



A. STEVENS CONTINUOUS. *B.* GURLEY PRINTING. *C.* FRIEZ.

WATER-STAGE RECORDERS.

the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet per second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 10, are based.

ACCURACY OF FIELD DATA AND COMPUTED RECORDS.

The accuracy of stream-flow data depends primarily (1) on the permanence of the stage-discharge relation and (2) on the accuracy of observation of stage, measurement of flow, and interpretation of records.

A paragraph in the description of the station gives information regarding the (1) permanence of the stage-discharge relation (2) precision with which the discharge rating curve is defined, (3) refinement of gage readings, (4) frequency of gage readings, and (5) methods of applying daily gage height to the rating table to obtain the daily discharge.

For the rating tables "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined," within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "run-off (depth in inches)" are therefore not computed if such errors appear probable. The computations are also omitted for stations on streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off (depths in inches)" previously published by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

The table of monthly discharge gives only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published.

COOPERATION.

During the year ending September 30, 1916, the work in Utah, Nevada, California, Oregon, and Wyoming has been done under cooperative agreements between the United States Geological Survey and the respective States.

Cooperation with the States is effected under contracts which are made between the Director of the Federal Survey and the State engineers or other officials and are authorized by legislative acts appropriating moneys. The State contracts are essentially of the same order, the principal provisions being substantially as follows:

1. The United States Geological Survey retains direct supervision of the field work and the preparation of the data for publication.
2. The Federal Survey retains possession of field notes, maps, and other material collected, but this material is open at all times to inspection by the State officials, and if not satisfactory the agreements can be terminated at any time.
3. The salaries of gage observers and engineers and the traveling and field expenses of the engineers are divided between the two parties in some manner agreed upon, the accounts being rendered monthly in accordance with the regulations of the Federal Survey.
4. The streams and localities in which investigations shall be made are determined by conference between the State officials and the representatives of the United States Geological Survey.
5. The cost of publication is borne entirely by the Federal Survey.

In general, the cooperative agreements specify that the United States Geological Survey shall allot from its appropriation a sum equal to that appropriated from State funds.

Special acknowledgments are due to W. D. Beers, State engineer of Utah; W. M. Kearney, State engineer of Nevada; W. F. McClure, State engineer of California; the State Water Commission of California, W. A. Johnston, president; John H. Lewis, State engineer of Oregon; and James B. True, State engineer of Wyoming, for the very efficient manner in which they have represented their States in the cooperative investigations.

Acknowledgments are also due to the officials and employees of the United States Reclamation Service, the United States Forest Service, the United States Office of Indian Affairs, and the United States Weather Bureau for free use of data collected by them.

Financial assistance has been rendered by the Utah State Agricultural College; Salt Lake City Corporation; Department of Public Service, Los Angeles, Cal.; Southern Pacific Co.; Utah Power & Light Co.; Logan, Hyde Park & Smithfield Canal Co.; Logan Northern Canal Co.; Logan River Water Users' Association; Blacksmith Fork Water Users' Association; Beaver County Irrigation Co.; Elko-Lamoille Light & Power Co.; Humboldt-Lovelocks Irrigation, Light

& Power Co.; Chewacan Land & Cattle Co.; Northwest Townsite Co.; Harney Basin Development Co.; Eastern Oregon Live Stock Co. (successor to the Wm. Hanley Co.); various canal and reservoir companies operating in Sevier River basin; George L. Swendsen; and Joseph Tognoni.

DIVISION OF WORK.

Data for stations in Utah and Nevada were collected and prepared for publication under the direction of E. A. Porter and C. C. Jacob, district engineers, assisted by Lynn Crandall, A. B. Purton, L. W. Jordan, J. J. Sanford, W. E. Dickinson, C. W. Bennett, and Miss Ruby Christensen.

For stations in California the data were collected and prepared for publication under the direction of H. D McGlashan, district engineer, assisted by J. H. Morgan, Charles Leidl, J. F. Kunesh, J. E. Jones, H. J. Tompkins, Thad McKay, and M. B. Trelease.

For stations in Oregon the data were collected and prepared for publication under the direction of F. F. Henshaw, district engineer, assisted by C. L. Batchelder, J. E. Stewart, P. V. Hodges, and R. C. Briggs.

For stations in Idaho the data were collected and prepared for publication under the direction of G. C. Baldwin, district engineer, assisted by A. W. Harrington, L. W. Roush, William Kessler, Miss E. H. Haugse, and H. J. Dean.

For the station in Wyoming the data were collected and prepared for publication under the direction of Robert Follansbee, district engineer, by H. W. Fear, R. H. Fletcher, H. K. Smith, and Miss Jane Hanna.

The records were reviewed and the manuscript assembled by W. E. Dickinson.

GAGING-STATION RECORDS.

GREAT SALT LAKE BASIN.

GAGES ON GREAT SALT LAKE.

LOCATION.—At Saltair, on the southeastern shore of the lake about 15 miles west of Salt Lake City, and at Midlake, on the Lucin cut-off of the Southern Pacific Railroad, about 30 miles west of Ogden, Weber County, Utah.

RECORDS AVAILABLE.—September 14, 1875, to December 15, 1899; March to July, 1904; October 1, 1912, to September 30, 1916. Records have appeared in publications of United States Geological Survey, as follows: Gage heights September 14, 1875, to January 4, 1890, in Monograph I, "Lake Bonneville," by G. K. Gilbert; gage heights September, 1875, to December, 1891, in the Thirteenth Annual Report of the Director, Part III; gage heights September 14, 1875, to December 15, 1899, in Water-Supply Paper 38; gage heights March 9 to July 21, 1904, in Water-Supply Paper 133; since October 1, 1912, gage heights have been published in water-supply papers. Chart showing variation in level of Great Salt Lake and monthly and annual precipitation in Great Salt Lake basin from 1850 to 1913 compiled from chart in office of chief engineer of Oregon Short Line Railroad, Salt Lake City, Utah, published by United States Geological Survey in Water-Supply Paper 330.

Gages.—Midlake gage read August 15, 1902, to September 30, 1916; Saltair gage July 1, 1903, to September 30, 1916. The first gage was installed at Blackrock in September, 1875, and was used until October, 1877. A gage at Farmington was used from November, 1877, to November, 1879, and one at Lake Shore from November, 1879, to September, 1881. Gages at Garfield Landing were used April, 1881, to December, 1899. In 1916, E. C. LaRue, hydraulic engineer, United States Geological Survey, installed a gage at Lake Point and by means of comparative readings for one month determined the relation between this gage and the gages at Saltair and Midlake. The elevation of the zero of the gage at Lake Point was determined from United States Geological Survey bench marks, the elevations of which had been adjusted in 1912 by the United States Coast and Geodetic Survey from precise leveling. From the Lake Point gage and the table of elevations given by G. K. Gilbert in Monograph I, Mr. LaRue determined the elevations above mean sea level of the zeros of the various gages to be as follows:

Blackrock	4,208.30
Farmington	4,206.80
Lake Shore	4,203.00
Garfield Landing (U. S. G. S.)	4,198.40
Garfield (Marcus E. Jones)	4,198.40
Midlake	4,198.01
Saltair	4,196.77

Accuracy.—Midlake gage read twice a month in inches and readings reduced to feet and tenths. Saltair gage read twice a month to feet and tenths.

Cooperation.—Readings on the Midlake gage are furnished by the Southern Pacific Co.; readings on the Saltair gage by the United States Weather Bureau.

Gage height in feet, of Great Salt Lake, Utah, for the year ending Sept. 30, 1916.

Day.	October.		November.		December.		January.		February.		March.	
	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.
1	4.7	3.5	4.5	3.2	4.5	3.2	4.5	3.3	4.7	3.4	5.2	3.8
15	4.6	3.3	4.5	3.2	4.5	3.2	4.6	3.3	5.0	3.6	5.4	4.0

Day.	April.		May.		June.		July.		August.		September.	
	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.	Saltair.	Midlake.
1	5.6	4.3	6.0	4.7	5.9	4.8	5.7	4.4	5.3	4.2	4.7	3.7
15	5.7	4.5	6.0	4.8	5.8	4.6	5.5	4.3	5.1	3.9	4.5	3.4

BEAR RIVER BASIN.

BEAR RIVER NEAR EVANSTON, WYO.

Location.—In sec. 1, T. 15 N., R. 121 W., 300 feet above highway bridge and 3½ miles northwest of Evanston, Uinta County. Nearest tributary a small stream entering from the southwest half a mile above.

Drainage area.—645 square miles (measured on topographic map and on map issued by the United States Geological Survey, scale 1 to 500,000).

Records available.—October 26, 1913, to September 30, 1916.

Gage.—Chain gage on left bank 300 feet above bridge; read by Mrs. Marion McClure.

Discharge measurements.—Made by wading or from cable just below gage.

Channel and control.—Bed composed of coarse gravel. Control at riffle a short distance below gage; permanent. Left bank is overflowed at stage about 5 feet. the amount of overflow increasing with the stage; right bank is also overflowed at stage above 5 feet, but to a much less extent than left bank.

Extremes of discharge.—Maximum stage recorded during year, 4.90 feet at 5.30 p. m. May 9 (discharge, 1,670 second-feet); minimum stage occurred September 3, when water was below gage (probable gage height, 0.80 foot; discharge about 6 second-feet).

1913–1916: Maximum stage recorded, 5.9 feet at 7 p. m. May 24, 1914 (discharge, 2,480 second-feet); channel reported nearly dry August 15, 1915.

Ice.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—Prior to December 1, 1916, there were adjudicated diversions of 249 second-feet from Bear River in Wyoming above station and 516 second-feet below.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent except as affected by ice. Rating curve well defined between 25 and 1,700 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records excellent.

Discharge measurements of Bear River near Evanston, Wyo., during the year ending Sept. 30, 1916.

Date	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 13	R. H. Fletcher	1.33	77	June 7	R. H. Fletcher	4.40	1,340
May 18	H. K. Smith	3.08	634	Aug. 9	H. K. Smith	1.38	76

Daily discharge, in second-feet, of Bear River, near Evanston, Wyo., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	115	55	53	....	345	790	1,170	277	18	25
2	103	55	58	....	840	690	995	277	18	21
3	96	56	....	....	640	690	995	277	26	8
4	82	63	....	....	481	840	1,050	217	30	12
5	105	63	....	....	382	1,110	1,230	178	52	16
6	85	69	....	....	382	1,230	1,350	156	91	12
7	89	72	....	....	345	1,410	1,350	156	102	9
8	92	62	....	....	382	1,530	1,470	110	84	10
9	75	62	....	....	546	1,600	1,530	165	69	8
10	69	63	....	....	592	1,600	1,530	156	70	23
11	62	58	....	....	1,170	1,230	1,600	121	64	44
12	66	53	....	....	995	1,230	1,530	110	54	39
13	72	51	....	....	840	1,050	1,350	89	56	33
14	72	55	....	....	740	890	1,470	95	52	41
15	75	56	....	....	690	740	1,350	95	54	23
16	92	63	....	....	740	502	1,230	82	55	18
17	85	68	....	....	690	640	1,230	88	58	17
18	79	63	....	....	690	592	1,230	81	55	23
19	82	69	....	....	592	640	1,230	58	51	21
20	75	66	....	1,050	382	640	1,050	52	49	18
21	63	58	....	1,230	481	569	940	44	51	20
22	63	59	....	1,170	420	569	840	32	41	26
23	58	69	....	1,290	460	546	690	25	38	24
24	58	63	....	1,050	524	640	592	23	24	21
25	61	66	....	995	592	546	502	15	24	21
26	55	69	....	546	740	524	382	16	21	15
27	55	69	....	345	790	546	382	23	21	21
28	61	55	....	460	1,050	592	345	33	23	22
29	55	55	....	364	1,170	740	294	30	20	21
30	53	52	....	262	890	995	277	17	33	17
31	59	....	....	310	....	1,110	....	24	26	....

Note.—Discharge interpolated Aug. 15. No gage-height record Dec. 3 to Mar. 19.

Monthly discharge of Bear River near Evanston, Wyo., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean	
October	115	53	74.6	4,590
November	72	51	61.2	3,640
March 20-31	1,290	262	756	18,000
April	1,170	345	653	38,900
May	1,600	502	872	53,600
June	1,600	277	1,040	61,900
July	277	15	101	6,210
August	102	18	46.1	2,830
September	44	8	21.0	1,250

BEAR RIVER AT HARER, IDAHO.

LOCATION.—In SE. ¼ sec. 22, T. 14 S., R. 45 E., three-fourths mile north of Harer siding on Oregon Short Line Railroad, Bear Lake County, 7 miles by road above Dingle, and 14 miles southeast of Montpelier.

DRAINAGE AREA.—2,780 square miles (determined by Utah Power & Light Co.).

RECORDS AVAILABLE.—June 21, 1913, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank; installed August 24, 1914; inspected by employees of Utah Power & Light Co. Inclined staff on right bank about 1,500 feet downstream prior to August 24, 1914; control different from that of present gage.

DISCHARGE MEASUREMENTS.—Made by wading or from cable just below gage.

CHANNEL AND CONTROL.—Bed composed of clean, hard material. Banks are overflowed at extremely high stages. Control permanent during 1915 and 1916.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.23 feet at 8 p. m. March 22 (discharge, 3,630 second-feet); minimum stage recorded, 3.13 feet, October 12–13 (discharge, 192 second-feet); minimum discharge probably occurred during winter.

1913–1916: Maximum stage recorded March 22, 1916; minimum stage recorded, 2.90 feet, 2 a. m. to 1 p. m., September 3, 1915 (discharge, 127 second-feet).

ICE.—Stage-discharge relation seriously affected by ice from November to March. Winter flow determined from current-meter measurements and from charts of water-stage recorder.

DIVERSIONS.—No large diversions above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent except as affected by ice. Rating curve well defined above 300 second-feet by measurements made in 1916 and those made by Survey engineers in 1915; measurements made by Karl Gilgen prior to 1916 believed to show too great a discharge. Operation of water-stage recorder satisfactory except for short periods November to March. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records good except those for November to March, which, owing to effect of ice, are somewhat uncertain.

COOPERATION.—Gage-height record furnished and most of the discharge measurements made by Utah Power & Light Co.

Discharge measurements of Bear River at Harer, Idaho, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	Karl Gilgen	3.16	227	Apr. 7	Karl Gilgen	5.70	1,260
13	do	3.13	209	13	Gilgen and Baldwin	6.16	1,500
20	do	3.36	280	13	G. C. Baldwin	6.17	1,500
28	do	3.28	263	20	Karl Gilgen	6.43	1,590
Nov. 3	do	3.27	262	27	do	6.29	1,540
10	do	3.29	260	May 4	do	7.27	2,020
18	do	[a] 3.48	292	11	do	8.14	2,420
24	do	3.31	265	18	do	6.98	1,860
Dec. 2	do	[a] 3.27	197	25	do	6.27	1,500
7	do	[a] 3.43	245	June 1	do	5.41	1,130
14	do	[a] 3.47	275	8	do	6.10	1,470
16	G. C. Baldwin	[a] 3.38	205	15	do	6.98	1,890
21	Karl Gilgen	[a] 3.25	200	22	do	7.08	1,890
28	do	[a] 3.23	182	29	do	5.11	1,000
Jan. 4	do	[a] 3.35	188	July 6	do	4.52	732
11	do	[a] 3.46	186	27	do	3.83	419
21	do	[a] 3.57	182	Aug. 3	do	3.58	343
26	do	[a] 3.64	203	10	do	3.53	321
Feb. 2	do	[a] 3.71	185	16	L. W. Roush	3.53	316
9	do	[a] 3.84	212	24	Karl Gilgen	3.39	268
16	do	[a] 3.76	205	31	do	3.46	301
24	do	[a] 3.81	209	Sept. 7	do	3.34	256
Mar. 1	do	[a] 3.86	215	14	do	3.39	278
8	do	[a] 3.91	256	21	do	3.31	255
15	do	[a] 5.68	948	28	do	3.23	201
29	do	6.77	1,760				

[a] Stage-discharge relation affected by ice.

NOTE.—Karl Gilgen is an employee of Utah Power & Light Co. Comparison of measurements made in 1915 and 1916 indicate all measurements made by Gilgen prior to April, 1916. gave too great a discharge; such measurements have not been used in developing the rating curve.

Daily discharge, in second-feet, of Bear River at Harer, Idaho, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	212	234		1,470	1,970	1,140	868	378	286
2	206	234		1,420	2,060	1,120	868	359	275
3	203	234		1,330	2,110	1,240	822	344	272
4	200	237		1,330	2,020	1,240	799	329	265
5	203	237		1,370	1,970	1,420	776	329	262
6	200	234		1,370	2,020	1,510	730	329	259
7	200	234		1,280	2,060	1,470	684	329	256
8	198	243		1,240	2,210	1,470	661	344	256
9	198	246		1,240	2,350	1,420	638	329	256
10	200	243		1,140	2,400	1,560	615	321	253
11	200	243		1,190	2,400	1,650	615	321	259
12	192	228		1,330	2,450	1,700	615	321	269
13	192	234		1,470	2,350	1,740	583	321	272
14	265	250		1,600	2,300	1,700	561	321	272
15	275	265		1,700	2,250	1,830	566	321	269
16	272	280		1,650	2,160	1,790	561	321	269
17	265	295		1,560	2,060	1,650	557	318	265
18	265	310		1,560	1,880	1,700	548	303	262
19	265	278		1,600	1,790	1,790	540	292	262
20	262	253		1,600	1,700	1,880	535	286	259
21	262	246	3,210	1,600	1,650	1,970	548	286	246
22	259	253	3,610	1,560	1,600	1,930	531	286	240
23	253	253	3,210	1,470	1,560	1,830	506	286	237
24	249	249	3,030	1,420	1,560	1,700	481	278	231
25	243	269	2,860	1,370	1,560	1,420	465	272	228
26	243	292	2,600	1,420	1,470	1,330	453	262	224
27	240		2,400	1,560	1,330	1,140	433	256	221
28	237		2,060	1,650	1,240	1,080	429	253	221
29	237		1,790	1,740	1,240	1,010	437	253	221
30	237		1,700	1,880	1,240	937	413	256	224
31	237		1,560		1,190		394	289	

NOTE.—Stage-discharge relation affected by ice Nov. 27 to Mar. 20; mean discharge estimated from discharge measurements, gage height record, and weather records, as follows: Nov. 27–30, 250 second-feet; Dec. 1–31, 220 second-feet; Jan. 1–31, 190 second-feet; Feb. 1–29, 205 second-feet; Mar. 1–10, 230 second-feet; Mar. 11–15, 500 second-feet; and Mar. 16–20, 1,700 second-feet. Gage not working properly Nov. 14–17; discharge interpolated.

Monthly discharge of Bear River at Harer, Idaho, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	275	192	231	14,200
November	310		[a] 252	15,000
December			[a] 220	13,500
January			[a] 190	11,700
February			[a] 205	11,800
March	3,610		[a] 1,330	81,800
April	1,880	1,140	1,470	87,500
May	2,450	1,190	1,880	116,000
June	1,970	937	1,510	89,800
July	868	394	588	36,200
August	378	253	306	18,800
September	286	221	253	15,100
The year	3,610		704	511,000

[a] See footnote to table of daily discharge.

BEAR RIVER AT ALEXANDER, IDAHO.

Location.—In NW. ¼ sec. 18, T. 9 S., R. 41 E., half a mile upstream from post office at Alexander, Bannock County, 6 miles above plant of Utah Power & Light Co. near Grace, 4 miles above intake of Last Chance canal, 30 miles below confluence of Bear Lake Outlet and Bear River.

Drainage area.—Not measured.

Records available.—March 27, 1911, to September 30, 1916.

Gage.—Stevens water-stage recorder on right bank installed September 15, 1914; inspected by employees of Utah Power & Light Co. March 27 to November 14, 1911, an inclined staff located on right bank 1,000 feet upstream was used; November 15, 1911, to September 14, 1914, an inclined and vertical staff at the present site. Present gage at same datum as staff gage used November 15, 1911, to September 14, 1914.

Discharge measurements.—Made from cable about 400 feet above gage.

Channel and control.—Bed composed of gravel and sand. One channel at all stages. Control permanent during 1915 and 1916.

Extremes of discharge.—Maximum stage recorded during year, 12.0 feet at 1.30 p. m. January 31, stage-discharge relation affected by ice; maximum discharge of 2,170 second-feet occurred at 9.30 p. m. March 25, at gage height 7.77 feet; minimum stage recorded, 4.96 feet at 7 a. m. November 15 (discharge 310 second-feet).

1911–1916: Maximum stage recorded, 13.8 feet at 3 p. m. December 22, 1914; maximum discharge of 3,940 second-feet occurred May 25–28, 1914, at gage height of 9.5 feet; minimum stage recorded November 15, 1915.

Ice.—Stage-discharge relation seriously affected by ice during winter.

Diversions.—Water is diverted above the station for irrigation and for storage for power development.

Regulation.—Water is diverted from Bear River to North or Mud Lake during the spring and released for power development during the summer. This water is returned to Bear River about 30 miles above the station.

Accuracy.—Stage-discharge relation permanent except as affected by ice. Rating curve well defined between 500 and 3,500 second-feet by measurements made in 1916 and by Survey engineers in 1913 and 1915; measurements made by Karl Gilgen prior to April, 1916, believed to show too great a discharge. Operation of water-stage recorder satisfactory except for a few days in December, January, and September. Daily discharge ascertained by applying to rating table mean daily gage height obtained by inspecting recorder charts, except during December, January, and February, when stage-discharge relation was affected by ice. Records (except those for winter) good.

Cooperation.—Gage-height record furnished and a large number of discharge measurements made by the Utah Power & Light Co.

Discharge measurements of Bear River at Alexander, Idaho, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 2	Karl Gilgen	5.32	549	Apr. 15	Karl Gilgen	6.04	922
9	do	5.26	512	17	G. C. Baldwin	5.93	839
16	do	5.37	587	22	Karl Gilgen	6.03	882
23	do	5.26	504	29	do	6.09	938
30	do	5.22	478	May 5	do	6.08	939
Nov. 6	do	5.18	460	13	do	5.78	743
13	do	[a] 5.22	450	17	L. W. Roush	6.26	975
20	do	5.37	541	20	do	6.70	1,330
27	do	[a] 5.05	342	20	Karl Gilgen	6.72	1,360
Dec. 4	do	[a] 5.70	645	27	do	6.13	952
11	do	[a] 5.35	535	June 3	do	5.99	834
17	G. C. Baldwin	[a] 5.56	330	10	do	6.18	962
18	Karl Gilgen	[a] 5.91	522	18	do	6.15	949
27	do	[a] 5.98	553	24	do	7.15	1,660
Jan. 3	do		[b] 885	July 1	do	7.04	1,550
8	do	[a] 10.16	966	8	do	6.10	908
15	do	[a] 9.70	669	29	do	6.31	1,040
24	do	[a] 10.40	881	Aug. 5	do	6.16	957
Feb. 5	do		[b] 761	12	do	6.12	928
12	do	[a] 6.18	586	17	L. W. Roush	6.37	1,100
19	do	[a] 5.91	666	19	Karl Gilgen	6.35	1,060
26	do	5.40	556	26	do	6.13	933
Mar. 4	do	5.52	625	Sept. 2	do	6.20	983
11	do	5.51	615	9	do	6.47	1,140
18	do	5.78	763	16	do	6.31	1,060
25	do	7.30	1,830	23	do	6.06	898
Apr. 1	do	6.30	1,070	30	do	5.94	812
10	do	5.80	738				

[a] Stage-discharge relation affected by ice.
[b] Measured at Soda Springs and estimated amount of inflow added to give discharge at Alexander.

NOTE.—Karl Gilgen is an employee of Utah Power & Light Co. Comparison of measurements made in 1915 and 1916 indicate that all measurements made by Gilgen prior to April, 1916, give too great a discharge; such measurements have not been used in developing the rating curve.

Daily discharge, in second-feet, of Bear River at Alexander, Idaho, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	474	425		598	1,050	922	830	1,600	985	1,020
2	485	420		570	1,050	922	860	1,570	954	985
3	469	415		626	1,020	891	860	1,530	954	985
4	459	415		598	1,020	860	860	1,460	954	1,020
5	459	410		626	1,020	860	891	1,280	954	985
6	464	410		543	954	922	922	1,150	1,050	985
7	469	410		543	860	922	922	985	1,080	985
8	469	415		543	770	922	954	954	1,080	891
9	459	430		570	741	891	985	1,080	1,080	1,150
10	500	440		626	770	800	985	1,080	1,020	1,120
11	516	435		626	770	770	891	1,020	985	1,050
12	495	440		654	860	800	922	985	954	1,080
13	480	425		683	860	741	954	985	954	1,050
14	480	374		626	830	741	1,020	1,020	954	985
15	480	387		598	891	770	985	1,020	1,020	1,020
16	511	576		626	891	741	954	985	1,150	1,080
17	527	490		741	860	891	1,020	985	1,080	1,020
18	506	495		770	830	1,150	954	1,020	1,120	954
19	490	506		954	830	1,180	891	1,020	1,120	985
20	474	500		1,240	860	1,320	1,080	985	1,180	954
21	459	490		1,460	922	1,180	1,350	985	1,320	954
22	454	480		1,600	891	1,080	1,460	985	1,210	954
23	449	454	626	1,810	800	954	1,570	954	1,120	922
24	444	440	570	1,720	770	922	1,640	954	1,050	922
25	444	425	543	1,890	770	954	1,720	954	985	891
26	454	392	543	1,940	800	954	1,720	985	954	879
27	454		570	1,890	860	954	1,720	1,050	922	867
28	449		570	1,760	922	891	1,640	1,050	985	854
29	449		598	1,530	922	860	1,600	1,050	985	842
30	435			1,210	954	800	1,600	1,020	1,020	830
31	430			1,080		800		985	1,020	

NOTE.—Gage not working Sept. 26–29; discharge interpolated. Stage-discharge relation affected by ice Nov. 27 to Feb. 22; mean discharge estimated from discharge measurements, recorder graph, and weather records, as follows: Nov. 27–30, 450 second-feet; Dec. 1–31, 550 second-feet; Jan. 1–31, 850 second-feet; and Feb. 1–22, 670 second-feet.

Monthly discharge of Bear River at Alexander, Idaho, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	527	430	471	29,000
November			[a]443	26,400
December			[a]550	33,800
January			[a]850	52,300
February			[a]647	37,200
March	1,940	543	1,010	62,100
April	1,050	741	878	52,200
May	1,320	741	915	56,300
June	1,720	830	1,160	69,000
July	1,600	954	1,090	67,000
August	1,320	922	1,040	64,000
September	1,150	830	974	58,000
The year	1,940		838	607,000

[a] See footnote to table of daily discharge.

BEAR RIVER NEAR PRESTON, IDAHO.

Location.—In sec. 9, T. 15 S., R. 39 E., at Seamon's ranch at Battle Creek highway bridge, half a mile above mouth of Battle Creek and 4½ miles northwest of Preston, Franklin County.

Drainage area.—4,500 square miles.

Records available.—October 11, 1889, to September 30, 1916.

Gage.—Vertical staff attached to old-bridge pile near right bank; installed July 22, 1915; read by O. M. Seamon. Inclined staff with vertical low-water section on left bank 50 feet below bridge, used December, 1904, to July 21, 1915, except from April 3, 1909, to July 6, 1914, when an inclined staff 500 feet below bridge was used. Gages used prior to December, 1904, were of vertical-staff or wire type and were attached to old Battle Creek bridge. Relation of datum of present gage to that of previous gages is not known, but datum is about 0.5 foot higher than that of gage installed in December, 1904.

Discharge measurements.—Made from cable about 200 feet below bridge.

Channel and control.—Bed composed of sand, clay, and gravel; one channel at all stages. Control fairly permanent except during flood stages.

Extremes of discharge.—Maximum stage recorded during the year, 3.29 feet at 8 a. m., March 21 (discharge, 3,020 second-feet); minimum stage recorded, 0.16 foot at 6 p. m., August 20 (discharge determined from extension of rating curve, 180 second-feet).

1889–1916: Maximum stage recorded, 5.7 feet June 12, 1907 (discharge, 6,550 second-feet); roughly approximate estimate of maximum stage, based on record at Collinston, Utah, 6.7 feet June, 1907 (discharge, 8,500 second-feet; minimum stage recorded, 0.5 foot, August 1–4 and 6–20, 1905 (discharge, 158 second-feet).

The above figures are somewhat misleading as to stage on account of differences in location and datum of various gages, but are not misleading as to dates and discharge.

Ice.—Stage-discharge relation at times seriously affected by backwater from ice.

Diversions.—Numerous ditches divert for irrigation above the station. Last Chance Canal, which diverts about 4 miles below the Alexander station, carried 270 second-feet May 25, 1911 (measured by engineer of Telluride Power Co.). West Cache Canal which heads several miles above the station carried 26 second-feet July 24, 1911, and 5 second-feet August 5, 1911. Water diverted by Utah Power & Light Co. about 6 miles below the Alexander station is used for power development and returned to the river above the station.

Regulation.—Considerable fluctuation is caused by release of water from Mud or North Lake about 150 miles above the station and by operation of power plants above the station.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read twice daily to quarter-tenths. Daily discharge determined by applying mean daily gage height to rating table. Records of daily discharge during spring and summer subject to error on account of diurnal fluctuation, but monthly means are fair. Records for remainder of year good.

Cooperation.—Gage height record furnished by Utah-Idaho Sugar Co.; one discharge measurement furnished by Utah Power & Light Co.

Record at this station shows practically the amount of water passing from Idaho into Utah and will be of value in the final adjudication of water rights.

Discharge measurements of Bear River near Preston, Idaho, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 17	Employee of Utah Power & Light Co....	0.84	557	July 9	L. W. Roush...........	1.50	958
18	L. W. Roush...........	2.61	2,160	24	.....do..................	1.31	860
June 3	.....do..................	1.11	690	Aug. 10	.....do..................	1.54	1,090
10	.....do..................	1.56	1,100	28	.....do..................	1.51	1,040
23	.....do..................	2.03	1,630	Sept. 17	.....do..................	1.65	1,160

Daily discharge, in second-feet, of Bear River near Preston, Idaho, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	752	548	490	1,320	998	679	1,790	1,570	955	1,420	830	912
2	437	548	390	580	1,130	752	1,470	1,570	912	1,420	752	679
3	464	679	370	830	1,090	679	1,470	1,570	791	1,370	871	611
4	437	464	716	1,040	998	645	1,680	1,680	871	1,320	871	966
5	548	716	679	1,470	998	548	1,570	1,680	1,040	1,270	998	1,320
6	611	318	830	791	912	912	1,570	1,680	1,130	1,230	548	1,040
7	490	318	791	519	912	791	1,570	1,130	998	1,130	548	611
8	645	296	716	645	955	830	1,470	1,470	1,090	998	679	912
9	716	490	580	912	1,090	912	1,420	1,420	1,040	390	716	971
10	390	645	645	998	830	1,180	1,470	1,230	1,040	548	955	1,030
11	611	370	645	871	679	716	2,380	1,320	871	871	830	1,090
12	679	679	548	752	1,230	912	2,260	1,320	1,130	830	998	912
13	791	437	580	580	912	998	1,790	1,320	1,040	912	1,790	830
14	548	437	414	679	830	998	679	1,270	1,040	791	645	912
15	998	548	580	830	679	1,420	1,040	1,130	998	716	1,040	912
16	328	314	752	1,040	752	955	1,570	1,130	998	830	716	1,040
17	464	548	490	1,090	830	1,090	1,470	1,470	1,040	580	955	1,090
18	437	791	1,130	1,270	679	1,320	1,570	1,680	998	490	955	1,420
19	437	791	314	1,420	679	1,470	1,570	2,020	716	791	1,090	1,040
20	519	679	390	1,040	1,040	2,130	1,570	1,790	955	716	414	1,090
21	611	611	1,090	1,370	580	2,640	1,370	1,370	1,040	716	1,130	791
22	490	548	1,180	955	998	2,260	1,470	1,090	1,320	519	1,130	716
23	490	580	871	912	679	2,380	1,370	716	1,470	752	1,270	830
24	830	611	752	1,040	830	2,130	1,370	1,090	1,470	716	830	791
25	830	437	830	1,130	830	2,640	1,370	1,130	1,570	679	871	912
26	716	548	830	716	871	2,770	1,420	791	1,570	679	1,090	1,040
27	611	830	716	548	414	2,640	1,470	871	1,680	871	1,040	1,130
28	314	679	912	580	679	1,790	1,680	716	1,570	955	791	1,090
29	328	830	998	611	791	2,380	1,680	830	1,470	1,370	912	548
30	437	437	998	490	......	2,020	1,680	830	1,470	679	752	580
31	548	......	912	611	......	1,900	......	912	......	1,040	349	......

Note.—Discharge interpolated Sept. 4, 9, and 10.

Monthly discharge of Bear River near Preston, Idaho, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	998	314	565	34,700
November	830	296	558	33,200
December	1,180	314	714	43,900
January	1,470	490	892	54,800
February	1,230	414	858	49,400
March	2,770	548	1,470	90,400
April	2,380	679	1,540	91,600
May	2,020	716	1,280	78,700
June	1,680	716	1,140	67,800
July	1,420	390	890	54,700
August	1,790	349	883	54,300
September	1,420	548	927	55,200
The year	2,770	296	977	709,000

BEAR RIVER NEAR COLLINSTON, UTAH.

LOCATION.—In the W. ½ sec. 34, T. 13 N., R. 2 W., about a quarter of a mile below Wheelon plant of Utah Power & Light Co., at Wheelon siding, 4 miles north of Collinston, Boxelder County. Below all large tributaries except Little Malad River, which enters about 20 miles below station.

DRAINAGE AREA.—6,000 square miles.

RECORDS AVAILABLE.—July 1, 1889, to September 30, 1916.

GAGE.—Gurley 8-day water-stage recorder on left bank about 12 feet above cable; used February 26, 1914, to September 30, 1916. Inspected by H. G. Stone. Friez recorder used November 8, 1913, to February 25, 1914. Gage installed July 1, 1889, and read to February 9, 1905, was a vertical iron bar driven into bed of stream on right bank directly opposite present gage. Gage used February 10, 1905, to November 7, 1913, was an inclined staff on right bank. Datum of gage in well to which recording gage is referred, is 0.05 foot higher than that of the vertical and slope gages.

DISCHARGE MEASUREMENTS.—Made from cable.

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Left bank high and not subject to overflow; right bank fairly high, but might be overflowed by exceptionally high floods. Control not well defined, but practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year from water-stage recorder, 5.45 feet at 10 a. m. March 23 (discharge 6,440 second-feet); minimum stage, 0.55 foot at 1 a. m. September 2 (discharge, 118 second-feet).

1889–1916: Maximum stage recorded, 7.7 feet June 7–10, 1909 (discharge, 11,600 second-feet); minimum stage, —0.55 foot August 4–12, 1905 (discharge, 10 second-feet).

ICE.—Stage-discharge relation not seriously affected by ice. Open water rating curve applicable except for short periods.

DIVERSIONS.—Numerous diversions for irrigation and power above this station. West side canal and Hammond (East Side) canal divert water by means of a low dam about 2 miles above station and near the upper end of Bear River Canyon. Water can be used from either or both of these canals to supply the Wheelon power plant and can be siphoned across at the plant from one canal to the other. Water passing the Wheelon penstocks is used for irrigation or can be wasted into the river.

REGULATION.—Flow at station regulated to some extent by operation of power plant.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Water-stage recorder gave satisfactory gage-height record except for three short periods in March, June, and September. Daily discharge ascertained by applying to rating table the mean daily gage height determined from recorder graph by inspection. Records excellent.

Discharge measurements of Bear River near Collinston, Utah, during the year ending Sept. 30, 1916.

Date	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	L. C. Monson [a]	1.85	968	May 11	L. C. Monson	4.00	4,050
Jan. 13	.....do	2.14	1,240	June 13	.....do	2.82	2,240
Mar. 28	.....do	4.48	4,800	July 17	W. E. Dickinson	1.44	611
Apr. 27	W. E. Dickinson	3.88	3,890				

[a] Utah Power & Light Co. engineer.

Daily discharge, in second-feet, of Bear River near Collinston, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	752	841	1,100	1,150	1,070	1,440	3,800	4,700	1,820	1,680	444	286
2	850	878	752	1,380	1,100	1,500	3,650	4,540	1,820	1,560	520	337
3	945	787	760	1,200	1,140	1,440	3,320	4,240	2,020	1,500	398	588
4	936	860	878	1,200	1,320	1,440	3,140	4,240	1,750	1,500	485	588
5	619	955	1,020	1,500	1,320	1,500	3,320	4,240	1,750	1,440	506	528
6	814	926	1,100	1,620	1,620	2,480	3,400	4,240	2,100	1,380	542	595
7	926	1,100	1,130	1,380	1,680	2,480	3,320	4,380	2,400	1,040	535	635
8	850	832	1,200	1,140	1,680	2,170	3,140	3,940	2,320	1,150	331	627
9	869	752	1,130	1,260	1,750	2,100	2,970	4,020	2,250	1,000	499	635
10	916	850	1,140	1,620	1,820	2,640	2,880	4,240	2,170	832	513	627
11	814	1,040	1,070	1,560	1,880	3,230	2,970	4,020	2,170	580	520	619
12	787	936	1,070	1,500	1,680	3,140	3,720	3,800	2,170	565	542	743
13	1,110	1,040	1,020	1,380	1,750	3,230	4,380	3,720	2,170	588	528	869
14	1,040	1,080	975	1,200	1,820	3,400	4,240	3,400	2,020	619	558	860
15	1,020	985	1,090	1,150	1,620	3,320	3,400	3,140	1,960	675	437	787
16	1,150	1,080	1,110	1,440	1,440	3,060	3,320	2,800	1,960	659	627	760
17	965	1,020	1,120	1,500	1,380	2,970	3,650	2,560	1,820	611	611	760
18	659	796	945	1,200	1,560	3,600	3,800	2,400	1,820	450	450	769
19	823	955	1,150	1,260	1,440	4,240	3,940	2,320	1,820	367	542	778
20	832	1,100	898	1,320	1,440	4,870	4,090	1,680	1,680	588	595	787
21	888	1,140	684	1,380	1,620	5,500	3,940	2,800	1,880	572	580	796
22	907	1,130	1,040	1,380	1,560	6,000	3,800	2,480	2,240	588	535	832
23	936	1,070	1,680	1,380	1,620	6,340	3,570	2,400	2,560	385	635	814
24	860	1,040	1,620	1,440	1,680	6,000	3,400	1,960	2,480	373	709	869
25	1,040	1,090	1,150	1,440	1,750	6,000	3,490	2,320	2,320	464	684	975
26	1,080	1,150	1,200	1,440	1,750	5,170	3,570	2,480	2,400	385	635	1,040
27	1,040	1,110	1,000	1,750	1,680	4,700	3,870	2,170	2,170	343	635	1,200
28	1,040	1,150	907	1,130	1,380	4,850	4,090	2,170	2,170	450	627	1,320
29	860	1,110	1,040	1,320	1,320	4,700	4,540	2,320	1,880	499	603	1,110
30	743	1,260	1,260	1,320	....	4,380	4,850	2,020	1,680	478	572	898
31	805	....	1,200	1,200	....	4,090	....	1,750	....	325	580	....

NOTE.—No gage height record, discharge interpolated, Mar. 18–20, June 8–9, Sept. 18–19.

Monthly discharge of Bear River near Collinston, Utah, for the year ending Sept. 30, 1916

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	1,150	619	899	55,300
November	1,260	752	1,000	59,500
December	1,680	684	1,080	66,400
January	1,750	1,130	1,360	83,600
February	1,880	1,070	1,550	89,200
March	6,340	1,440	3,610	222,000
April	4,850	2,880	3,650	217,000
May	4,700	1,680	3,140	193,000
June	2,560	1,680	2,060	123,000
July	1,680	325	763	46,900
August	709	437	548	33,700
September	1,320	286	768	45,700
The year	6,340	286	1,700	1,240,000

SODA CREEK NEAR SODA SPRINGS, IDAHO.

LOCATION.—In sec. 24, T. 8 S., R. 41 E., at George Schmidt's ranch, one-eighth mile below confluence of two branches of creek, about 5 miles north of Soda Springs, Bannock County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 5, 1913, to September 30, 1916.

GAGE.—Vertical staff on left bank about one-fourth mile south of ranch house, installed August 1, 1913. Read by George Schmidt. Gage used March 5 to July 31, 1913, was 30 feet upstream, but had same control. Datum of old gage between 0.1 and 0.2 feet above that of present gage.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock. Control is a reef about 15 feet below the gage. Stage-discharge relation affected by growth of moss during summer. During 1915 stage-discharge relation affected by extension of a wing dam at head of small ditch, which takes water from right bank at control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.42 feet at noon, March 24 (discharge, 95 second-feet); minimum stage recorded, 4.00 feet, March 4 to 9 (discharge, 38 second-feet).

1913–1916: Maximum stage recorded, 5.3 feet April 6, 1913 (discharge, 324 second-feet); minimum stage recorded March 4 to 9, 1916.

ICE.—Stage-discharge relation unaffected by ice.

DIVERSIONS.—Practically no water diverted above the station; a small ditch takes water just below the gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent on account of effect of aquatic growth; not affected by ice. Gage read to quarter-tenths daily. Daily discharge ascertained by applying daily gage height to several rating tables and by shifting control method. Records good, except for January to March, for which there was some uncertainty as to the proper rating.

Discharge measurements of Soda Creek near Soda Springs, Idaho, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Dec. 15	G. C. Baldwin	4.11	44	June 5	L. W. Roush	4.14	54
Apr. 16	do	4.14	54	Aug. 16	do	4.11	52
May 17	L. W. Roush	4.16	55				

Daily discharge, in second-feet, of Soda Creek near Soda Springs, Idaho, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	46	44	44	44	41	40	61	55	59	55	49	49
2	46	44	44	44	41	40	59	55	59	55	49	49
3	46	44	44	42	42	40	59	52	59	55	49	49
4	46	44	46	42	42	38	59	52	59	55	49	49
5	46	44	46	42	42	38	61	52	56	55	49	49
6	46	44	46	42	42	38	61	52	59	55	49	49
7	46	44	46	42	42	38	59	52	59	55	49	49
8	46	44	46	39	42	38	55	52	59	55	49	49
9	46	44	46	39	42	38	52	52	59	55	49	49
10	46	44	46	39	42	40	52	52	59	52	49	49
11	46	44	46	39	42	40	52	52	59	52	49	49
12	44	46	46	39	42	40	52	52	59	52	47	47
13	44	46	46	40	40	40	52	52	59	52	47	47
14	44	46	46	40	40	40	52	52	55	52	47	47
15	44	46	45	40	40	40	52	52	55	52	47	47
16	44	46	44	40	40	40	54	52	55	52	49	47
17	44	46	44	40	40	44	52	55	64	52	47	47
18	44	46	44	40	40	44	52	55	64	49	47	47
19	44	46	44	40	40	59	52	59	64	49	47	47
20	44	46	44	40	40	61	52	59	64	49	47	47
21	44	46	44	40	40	76	52	59	64	49	47	47
22	44	46	44	40	40	88	52	59	64	49	47	47
23	44	46	44	40	40	92	52	59	64	49	49	47
24	44	46	44	41	40	95	55	59	64	49	49	47
25	44	44	44	41	40	92	55	59	64	49	49	47
26	44	44	44	41	40	76	55	59	61	49	49	47
27	44	44	44	41	40	84	55	59	61	49	49	47
28	44	44	44	41	40	84	59	59	59	49	49	47
29	44	44	44	41	40	84	59	59	59	49	49	47
30	44	44	44	41	....	68	59	59	55	49	49	47
31	44	....	44	41	....	61	....	59	....	49	49	....

Monthly discharge of Soda Creek near Soda Springs, Idaho, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	46	44	44.7	2,750
November	46	44	44.9	2,670
December	46	44	44.7	2,750
January	44	39	40.7	2,500
February	42	40	40.8	2,350
March	95	38	56.0	3,440
April	61	52	55.1	3,280
May	59	52	55.3	3,400
June	64	55	60.0	3,570
July	55	49	51.5	3,170
August	49	47	48.4	2,980
September	49	47	47.7	2,840
The year	95	38	49.2	35,700

LOGAN RIVER ABOVE STATE DAM, NEAR LOGAN, UTAH.

Location.—In NW. ¼ NE. ¼ sec. 36, T. 12 N., R. 1 E., at Logan plant of Utah Power & Light Co., 125 feet above confluence of tailrace with river, 2½ miles above Logan, Cache County.

Drainage area.—218 square miles. Practically the same as at old station on Logan River near Logan, Utah.

Records available.—May 7, 1913, to September 30, 1916; at old station a quarter of a mile downstream, June 1, 1896, to July 17, 1903, and April 14, 1904, to December 31, 1912; flow at station plus that of tailrace comparable to that at old station.

Gage.—Stevens continuous water-stage recorder on right bank about 100 feet west of power house. Inspected by employee of Utah Power & Light Co.

Discharge measurements.—Made by wading at gage; high-water measurements made from footbridge at the switch rack about 1,200 feet below, and flow in tailrace deducted.

Channel and control.—Banks fairly high, clean, and not subject to overflow. Right bank is a dry rubble retaining wall. Control is concrete cut-off wall about 6 feet below the gage. Stage of zero flow, 0.45 foot.

Extremes of discharge.—Maximum stage recorded during year, 5.6 feet at 9.30 a. m. March 21 (discharge estimated 2,000 second-feet); minimum discharge 8 second-feet December 11, stage-discharge relation affected by backwater.

1913–1916: Maximum discharge 2,000 second-feet, March 21, 1916; minimum discharge, 8 second-feet, December 11, 1915.

Ice.—Stage-discharge relation not affected by ice.

Diversions.—The Utah Power & Light Co. diverts water above station for power and the Logan, Hyde Park & Smithfield canal diverts for irrigation. The city of Logan has a municipal power plant about 2 miles above station but water is returned to river above the two diversions noted. The city of Logan is entitled to divert for municipal supply from 4 to 10 second-feet of water, from springs in sec. 22, T. 12 N., R. 2 E., the quantity depending on flow in the river.

Regulation.—Some diurnal fluctuation is caused at times by operation of the two power plants.

Accuracy.—Stage-discharge relation affected during the winter by backwater from the State dam. On March 21 a portion of the artificial control was destroyed by flood and the stage-discharge relation was more or less unstable until September 1. Control was repaired September 2–5, after which the relation remained permanent. Well-defined rating curves October 1, 1915, to March 20, 1916, and September 6–30, 1916; fairly well defined March 21 to June 4 and June 19 to September 1. Operation of water-stage recorder satisfactory except March 18–21 and September 6–10. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recording gage graph, except for periods affected by backwater, and on March 21, for which it was determined by averaging the discharge obtained by applying hourly gage heights to rating table. Shifting-control method and comparison with records of station below dam and records of canals used for periods when rating curves were not directly applicable. Records good.

Discharge measurements of Logan River above State dam, near Logan, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 11	Lynn Crandall	0.94	19.6	Sept. 12	A. B. Purton	1.55	89.0
Jan. 13	J. J. Sanford	[a]1.20	24.0	13	L. W. Jordan	1.54	83.7
Mar. 31	A. B. Purton	1.59	154	13	A. B. Purton	1.52	83.5
Apr. 29	Dickinson and Purton	2.91	690	17	L. W. Jordan	1.46	73.7
July 19	W. E. Dickinson	2.02	228	18	do	1.49	81.3
20	do	2.00	225	19	A. B. Purton	1.45	76.5
Sept. 8	A. B. Purton	1.58	92.1	20	L. W. Jordan	1.46	77.1
9	Purton and Jordan	1.58	87.6	22	A. B. Purton	1.40	72.6
10	A. B. Purton	1.57	90.1	23	L. W. Jordan	1.44	71.8
11	L. W. Jordan	1.56	88.3	26	A. B. Purton	1.40	68.5

[a] Stage-discharge relation affected by backwater from State dam.

Daily discharge, in second-feet, of Logan River above State dam, near Logan, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	23	12	19	22	30	29	161	610	604	532	139	93
2	23	12	15	20	31	30	178	604	582	527	131	90
3	22	12	10	22	32	29	181	620	615	523	124	60
4	23	13	15	24	31	29	192	684	655	523	126	75
5	22	13	12	21	31	30	200	808	776	475	116	85
6	22	13	12	23	30	30	176	802	821	461	110	85
7	21	23	12	23	28	30	168	866	776	443	104	87
8	20	27	12	22	26	30	178	802	789	400	108	87
9	20	23	10	22	26	32	194	847	795	392	114	86
10	20	20	11	22	29	39	247	828	834	372	114	89
11	20	20	8	22	30	53	341	745	814	338	110	89
12	20	24	16	23	29	67	341	672	782	320	106	85
13	18	24	10	23	27	67	294	620	764	302	97	84
14	16	19	10	25	29	64	304	566	721	295	91	100
15	16	21	11	23	28	59	337	545	727	285	88	79
16	15	28	17	23	28	59	349	524	776	268	86	78
17	24	21	18	23	28	64	377	519	776	255	86	76
18	13	21	18	29	27	80	415	561	733	246	88	76
19	13	20	22	35	26	94	390	582	732	233	86	75
20	12	20	26	32	27	150	345	626	727	227	80	73
21	12	20	21	24	28	325	322	598	721	213	78	69
22	12	20	22	29	26	225	322	655	666	202	72	70
23	12	20	18	30	29	220	341	643	608	196	70	71
24	13	18	19	30	28	200	390	610	587	188	70	71
25	13	18	21	31	28	171	499	571	567	183	90	68
26	13	18	18	30	29	154	571	540	572	178	91	66
27	13	18	22	29	30	164	690	499	572	170	90	63
28	13	17	21	28	30	189	770	480	567	165	86	60
29	13	20	16	29	31	178	721	490	557	160	86	59
30	13	22	25	30	......	164	643	550	542	153	93	59
31	12	......	30	29	......	158	......	588	......	151	90	......

Monthly discharge of Logan River above State dam, near Logan, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	24	12	16.8	1,030
November	28	12	19.2	1,140
December	30	8	16.7	1,030
January	35	20	25.7	1,580
February	32	26	28.7	1,650
March	325	29	104	6,400
April	770	161	355	21,100
May	847	480	634	39,000
June	834	542	692	41,200
July	532	151	302	18,600
August	139	70	97.4	5,990
September	100	59	76.9	4,580
The year	847	8	197	143,000

LOGAN RIVER BELOW LOGAN NORTHERN CANAL, NEAR LOGAN, UTAH.

Location.—In NW. ¼ sec. 36, T. 12 N., R. 1 E., about 500 feet below heading of Logan Northern canal, 850 feet below State dam, and 2 miles above Logan, Cache County.

Drainage area.—Not measured.

Records available.—July 26, 1915, to September 30, 1916.

Gage.—Stevens continuous water-stage recorder on left bank about 200 feet southwest of the bridge by which State road crosses Logan Northern canal. Inspected by William Hughie.

Discharge measurements.—Made by wading or from cable 125 feet below gage.

Channel and control.—Bed composed of gravel and large boulders. Shifting. Banks not subject to overflow. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 8.35 feet at 9.45 a. m. March 21 (discharge, 1,500 second-feet); minimum stage, 3.71 feet October 21–25 (discharge, 26 second-feet).

1915–1916: Maximum and minimum same as above.

Ice.—Stage-discharge relation not seriously affected by ice.

Diversions.—Logan, Hyde Park & Smithfield canal, and Logan Northern canal divert water above station for irrigation. The city of Logan is entitled to divert for municipal supply from 4 to 10 second-feet of water, from springs in sec. 22, T. 12 N., R. 2 E., the quantity depending on flow in the river.

Regulation.—Operation of power plants above causes some diurnal fluctuation at times during low-water periods.

Accuracy.—Stage-discharge relation disturbed by flood of March 21. Rating curves fairly well defined between 50 and 700 second-feet. Operation of water-stage recorder satisfactory except for three breaks in the record, as noted in footnote to daily discharge table. Daily discharge ascertained by applying to rating tables, the mean daily gage height determined by inspecting recorder graph except during periods for which stage-discharge relation is affected by shifting control, and for days of sudden changes of stage when it was determined by averaging the discharge obtained by applying to rating table the hourly gage height. Records good.

Discharge measurements of Logan River below Logan Northern canal, near Logan, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	E. A. Porter	4.39	77.5	Sept. 10	A. B. Purton	4.57	111
Nov. 11	Lynn Crandall	4.42	74.7	11	Jordan and Purton	4.57	108
23	R. B. West	4.45	83.8	11	L. W. Jordan	4.57	111
Dec. 5	do	4.30	63.6	12	do	4.56	104
5	do	4.39	62.6	13	A. B. Purton	4.54	108
5	do	4.23	56.7	16	L. W. Jordan	4.56	109
Jan. 13	Stoner and Sanford	4.40	76.3	17	A. B. Purton	4.56	109
Mar. 31	A. B. Purton	4.96	221	18	L. W. Jordan	4.56	107
Apr. 29	Dickinson and Purton	6.32	650	19	do	4.54	106
July 20	do	5.05	220	22	do	4.53	103
Sept. 8	L. W. Jordan	4.60	115	29	do	4.48	100
9	do	4.56	107				

Daily discharge, in second-feet, of Logan River below Logan Northern canal, near Logan, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	64	73	70	77	89	234	606	570	445	157	118
2	....	62	73	74	79	86	252	624	534	432	150	117
3	....	62	73	76	80	86	254	624	552	432	177	109
4	....	62	73	80	81	88	265	662	606	410	190	95
5	....	61	68	76	81	82	273	737	718	388	194	98
6	....	63	72	73	72	96	250	756	737	378	163	105
7	....	72	73	69	88	89	242	814	718	369	130	112
8	76	73	69	70	86	89	250	788	718	345	132	108
9	74	68	69	79	82	92	262	779	718	336	137	110
10	66	67	61	76	82	95	322	733	737	324	136	110
11	68	73	73	76	84	102	416	707	737	310	129	109
12	72	73	67	74	....	122	432	680	718	302	127	108
13	70	73	73	73	....	133	369	570	699	339	124	106
14	70	61	76	73	....	133	369	534	680	351	146	114
15	72	62	72	75	....	133	403	499	680	339	158	112
16	70	57	72	66	....	136	410	492	680	294	112	109
17	66	66	70	67	....	143	445	499	680	250	134	109
18	67	65	67	72	....	158	475	534	680	240	165	109
19	67	62	55	79	....	177	439	552	680	225	165	106
20	55	82	67	81	76	229	388	588	662	218	158	104
21	26	81	75	77	82	325	369	570	662	209	154	103
22	26	81	77	76	79	310	575	588	624	209	148	104
23	26	75	84	72	88	291	400	552	588	205	143	115
24	26	74	77	82	85	283	452	552	552	194	143	109
25	26	73	73	80	82	237	524	499	534	189	124	112
26	45	75	76	77	86	230	588	485	534	183	109	106
27	66	76	73	74	82	237	662	448	534	179	120	109
28	66	73	67	73	89	265	718	435	516	176	115	106
29	65	69	79	77	89	254	662	442	493	176	114	99
30	70	76	72	68	....	240	624	499	468	171	120	104
31	62	....	66	79	....	227	....	552	....	164	120	....

NOTE.—On account of breaks in recording gage record discharge was interpolated Oct. 1–7, 76 second-feet and Feb. 12–19, 80 second-feet; discharge Sept 1–6 was determined from a comparison with the total flow above the State dam.

Monthly discharge of Logan River below Logan Northern canal, near Logan, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	....	26	62.2	3,820
November	82	57	69.4	4,130
December	84	55	71.5	4,400
January	82	66	74.6	4,590
February	89	72	81.7	4,700
March	325	82	170	10,500
April	718	234	411	24,500
May	814	435	594	36,500
June	737	468	634	37,700
July	445	164	283	17,400
August	194	109	142	8,730
September	118	95	108	6,430
The year	814	26	225	164,000

UTAH POWER & LIGHT CO.'S TAILRACE NEAR LOGAN, UTAH.

LOCATION.—In NE. ¼ sec. 36, T. 12 N., R. 1 E., 100 feet below power house at plant of Utah Power & Light Co., about 2½ miles above Logan, Cache County.

RECORDS AVAILABLE.—May 7, 1913, to September 30, 1916.

GAGE.—Friez water-stage recorder on right bank just above weir; inspected by employee of Utah Power & Light Co.

DISCHARGE MEASUREMENTS.—Made from footbridge just above gage.

CHANNEL AND CONTROL.—Rectangular wooden weir, with metal crest strip, just below gage. Capacity of channel above weir not sufficient to eliminate all velocity of approach. Stage of zero flow, zero on gage.

Extremes of discharge.—Maximum stage recorded during year, 1.32 feet at 7 p. m., October 11 (discharge, 102 second-feet); no flow at times during repairs to flume or machinery.

1913-1916: Maximum stage recorded, 1.77 feet May 8, 1914 (discharge, 162 second-feet); no flow at times.

Ice.—Stage-discharge relation not affected by ice.

Regulation.—Flow at station affected by operation of power plant.

Accuracy.—Stage-discharge relation permanent. Rating curve well defined. Water-stage recorder operated satisfactorily throughout the year. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for April 19 to July 11, for which it was determined by averaging the discharge obtained by applying hourly gage height to rating table. Records good.

Canal diverts water from right bank of Logan River in SE. ¼ of SW. ¼, sec. 29, T. 12 N., R. 2 E. Water is returned to river 150 feet below gaging station on Logan River above State dam, in the NW. ¼ of NE. ¼, sec. 36, T. 12 N., R. 1 E. Water is used for power development.

Discharge measurements of Utah Power & Light Co.'s tailrace near Logan, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	E. A. Porter	1.24	91	Mar. 31	A. B. Purton	1.18	82
Nov. 11	Lynn Crandall	1.21	85	Apr. 29	Purton and Dickinson	1.07	73
11	Eugene Schaub[a]	1.20	86	July 19	W. E. Dickinson	1.23	88
15	do	1.22	90	Sept. 6	Jacob and Purton	1.20	[c] 88
16	do	1.09	74	12	L. W. Jordan	1.22	89
19	do	1.27	93	19	A. B. Purton	1.17	84
Jan. 13	Stoner[b] and Sanford	1.04	70	22	do	1.18	86

[a] Civil and hydraulic engineer, Logan, Utah.
[b] Engineer of Utah Power & Light Co.
[c] Vertical-velocity curve method used.

Daily discharge, in second-feet, of Utah Power & Light Co.'s tailrace near Logan, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	91	92	76	66	65	77	85	53	30	32	92	87
2	92	91	80	72	68	77	84	54	30	32	92	87
3	92	89	85	74	70	74	84	58	29	32	92	87
4	92	89	80	76	72	74	84	54	34	12	93	87
5	92	88	83	75	68	78	84	53	32	31	93	87
6	92	89	83	70	69	79	85	54	32	29	92	88
7	92	92	83	67	77	76	85	54	32	32	91	88
8	92	92	83	70	76	77	85	53	31	52	89	88
9	92	91	85	73	73	76	85	53	31	53	85	88
10	92	91	84	73	72	77	85	53	31	63	85	89
11	94	99	87	73	72	78	84	54	35	86	84	85
12	94	97	79	72	69	79	85	54	20	88	85	89
13	97	87	85	72	68	82	85	54	20	91	86	86
14	97	82	85	70	73	86	85	54	19	91	87	68
15	99	91	84	72	73	89	85	29	19	91	87	82
16	99	66	78	60	74	91	84	29	19	91	87	82
17	72	85	77	61	74	94	83	29	19	91	87	82
18	94	84	73	66	73	95	85	39	19	92	86	83
19	94	87	61	70	75	99	66	29	31	91	84	84
20	93	87	68	70	72	98	51	29	32	86	88	84
21	93	85	74	66	74	94	51	29	32	92	87	85
22	92	87	76	65	75	89	51	29	31	92	87	85
23	92	85	82	68	75	70	57	29	31	91	87	85
24	92	87	79	69	74	86	60	32	31	91	86	86
25	93	84	76	70	74	85	58	29	31	91	86	86
26	93	87	77	69	75	85	55	29	35	91	86	87
27	92	85	68	62	76	85	55	29	36	91	86	89
28	92	67	64	60	75	85	54	29	26	92	86	89
29	92	77	79	63	76	84	54	29	31	92	86	91
30	93	82	65	61		85	54	29	31	92	88	91
31	91		55	65		85		29		91	87	

Monthly discharge of Utah Power & Light Co.'s tailrace near Logan, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	99	72	92.5	5,690
November	99	66	86.5	5,150
December	87	55	77.2	4,750
January	76	60	68.4	4,210
February	77	65	72.7	4,180
March	99	70	83.5	5,130
April	85	51	72.9	4,340
May	58	29	40.7	2,500
June	36	19	28.7	1,710
July	92	12	73.3	4,510
August	93	84	87.6	5,390
September	91	68	85.8	5,110
The year	99	12	72.5	52,700

LOGAN, HYDE PARK & SMITHFIELD CANAL NEAR LOGAN, UTAH.

LOCATION.—In NW. ¼ NE. ¼ sec. 31, T. 12 N., R. 2 E., at concrete rating flume about half a mile below head of canal, 1 mile below city power plant, 1 mile above plant of Utah Power & Light Co., and 3½ miles from Logan, Cache County.

RECORDS AVAILABLE.—Fragmentary 1904–1912. Fairly continuous April 22, 1912, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank near lower end of rating flume; installed June 6, 1913. Records April 22, 1912, to March 31, 1913, obtained from vertical staff gage at point about 1½ miles below present gage; two wasteways between the two points. Prior to April 22, 1912, gages were maintained at various points. Gage inspected by G. B. Folkman.

DISCHARGE MEASUREMENTS.—Made by wading or from a foot plank at the flume.

CHANNEL AND CONTROL.—Rectangular concrete rating flume. Stage of zero flow after control board was installed in April, 1915, 0.35 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 2.39 feet at 12 p. m. July 20 (discharge, 111 second-feet); minimum stage recorded, 0.53 foot, April 30 (discharge 2.6 second-feet); minimum discharge probably zero (while canal is being cleaned).

1912–1916: Maximum stage recorded, 2.46 feet July 24, 1914 (discharge, 114 second-feet).

WINTER FLOW.—Recording gage usually removed during winter. A small flow of water is maintained for domestic use.

DIVERSIONS.—None above the gage.

REGULATION.—Flow regulated by headgates at diversion works.

ACCURACY.—Stage-discharge relation permanent; record discontinued during winter Rating curve well defined below 120 second-feet. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage-height determined by inspecting recorder graph. Records excellent.

Canal diverts water from Logan River in the NE. ¼ NE. ¼ sec. 31, T. 12 N., R. 2 E., for irrigation and domestic use in the territory north of Logan. The water is not returned to the river.

Discharge measurements of Logan, Hyde Park & Smithfield canal near Logan, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	E. A. Porter	0.93	22.9	Apr. 29	Purton and Dickinson	0.55	3.1
Nov. 11	Lynn Crandall	.71	11.3	July 19	W. E. Dickinson	2.35	110

Daily discharge in second-feet, of Logan, Hyde Park & Smithfield canal near Logan, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Apr.	May.	June.	July.	Aug.	Sept.
1	25	21	14	7.5		8.1	76	102	106	49
2	25	21	14	7.5		23	80	102	108	49
3	25	20	14	7.5		28	80	101	108	80
4	26	20	14	7.5		49	83	101	107	62
5	25	20	14	7.5		51	85	100	107	48
6	24	20	14	7.5		65	86	99	106	48
7	24	11	14	8.7		80	88	99	106	44
8	23	3.7	14	8.7		97	85	106	99	40
9	23	6.9	14	8.7		100	92	106	87	40
10	23	12	14	8.7		99	95	106	83	40
11	23	12	14	8.7		98	93	106	82	40
12	23	12	14	8.7		100	92	105	81	40
13	22	12	14	8.7		102	94	104	84	40
14	22	12	14	8.7		99	97	106	87	40
15	22	12	14	8.7		92	98	106	87	40
16	21	12	14	8.7		92	99	106	86	40
17	25	15	14	8.7		91	99	106	83	40
18	24	15	14	9.3		92	97	109	76	40
19	23	15	10	9.3		88	94	108	82	40
20	23	15	5.8	9.3		72	93	108	88	40
21	23	15	5.8	9.3		72	93	108	89	40
22	22	15	5.8	8.7		73	96	107	92	40
23	22	15	7.5	8.7		85	99	106	92	39
24	22	15	7.5	8.7	6.4	85	96	106	78	39
25	22	15	7.5	8.7	6.4	72	94	106	61	38
26	22	14	7.5	8.7	7.5	71	93	105	61	38
27	22	14	7.5	8.7	8.7	69	93	104	61	38
28	22	14	7.5	8.7	6.4	69	93	104	61	38
29	22	14	7.5	8.7	3.4	69	94	104	58	38
30	22	15	7.5	8.7	2.6	70	102	103	49	38
31	21		7.5	8.7		70		102	49	

NOTE.—No record kept during winter; probably a small flow maintained for domestic use.

Monthly discharge of Logan, Hyde Park & Smithfield canal near Logan, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	26	21	23.0	1,410
November	21	3.7	14.5	863
December	14	5.8	11.2	689
January	9.3	7.5	8.55	526
April 24–30	8.7	2.6	5.91	82.1
May	102	8.1	75.2	4,620
June	102	76	92.0	5,470
July	109	99	105	6,460
August	108	49	84.0	5,160
September	80	38	42.9	2,550

NOTE.—No records kept during winter.

LOGAN NORTHERN CANAL NEAR LOGAN, UTAH.

Location.—In NW. ¼, sec. 36, T. 12 N., R. 1 E., at upper end of timber-lined section about 800 feet below head of canal and 2 miles above Logan, Cache County.

Records available.—June 6, 1913, to September 30, 1914; May 13, 1915, to October 2, 1916. Station discontinued.

Gage.—Stevens continuous water-stage recorder on right bank immediately above lined section of canal. Inspected by employee of Logan Northern Canal Co.

Discharge measurements.—Made by wading or from footplank.

Channel and control.—Bed at gage is of earth and gravel; immediately below is a timber-lined rectangular section which contracts the width very slightly. A low control board has been installed at upper end of this section making stage of zero flow 0.45 foot.

Extremes of discharge.—Maximum stage recorded during year, 2.52 feet, May 22 (discharge, 91 second-feet); canal dry part of year.

1913–1916: Maximum stage recorded, 2.58 feet, July 15, 1913 (discharge, 103 second-feet); canal dry most of nonirrigation season.

Winter flow.—No record kept during winter; canal is usually dry.

Diversions.—Above all diversions.

Regulation.—Flow regulated by head gates at point of diversion.

Accuracy.—Stage-discharge relation permanent. Rating curve fairly well defined between 20 and 90 second-feet. Operation of water-stage recorder satisfactory except for breaks in record as shown in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for days when there was considerable fluctuation for which the mean of hourly discharge was used. Records good.

Canal heads in right bank of Logan River in the SW. ¼ NW. ¼ sec. 36, about 350 feet below the State dam. The water is used primarily for irrigation and is not returned directly to the river.

Records of daily and monthly discharge for October, November, and December, 1915, published in Water-Supply Paper 410, should be disregarded.

Discharge measurements of Logan Northern canal near Logan, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	E. A. Porter	0.94	22.6	Sept. 11	L. W. Jordan	1.62	46.2
Nov. 11	Lynn Crandall	0.99	23.1	12	A. B. Purton	1.60	47.0
Apr. 29	A. B. Purton	1.06	27.8	13	L. W. Jordan	1.61	46.7
July 20	W. E. Dickinson	2.39	84.0	16	do	1.59	46.0
Sept. 7	L. W. Jordan	1.62	46.7	17	A. B. Purton	1.56	44.8
8	do	1.66	48.9	19	do	1.58	44.6
9	A. B. Purton	1.62	47.5	22	L. W. Jordan	1.58	43.7
10	do	1.62	46.9				

Daily discharge, in second feet, of Logan Northern canal near Logan, Utah, for the period Oct. 1, 1915 to Oct. 2, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	20	25	6	2	......	10	54	79	67	62	44
2	20	25	6	2	......	......	60	80	67	63	26
3	20	25	6	2	......	......	62	80	16	36	......
4	20	24	6	1	......	......	64	79	......	60	......
5	20	24	6	......	......	......	68	78	......	67	......
6	20	24	6	......	......	......	67	78	31	60	......
7	20	26	6	......	......	......	67	80	62	49	......
8	20	30	6	......	......	......	74	86	65	46	......
9	20	30	6	......	......	29	82	87	66	46	......
10	20	30	12	......	......	52	69	87	66	46	......
11	20	26	4	......	......	39	68	85	67	46	......
12	20	23	4	......	......	22	68	82	68	45	......
13	20	23	3	......	8	76	73	22	67	45	......
14	20	20	3	......	14	76	78	......	25	46	......
15	20	28	3	......	14	74	78	......	17	46	......
16	20	32	3	1	14	76	78	42	62	44	......
17	20	24	3	2	14	80	78	82	34	43	......
18	20	24	3	2	14	84	80	83	......	44	......
19	20	22	2	2	......	85	80	84	......	44	......
20	28	6	2	2	......	88	80	84	......	44	......
21	56	5	1	2	......	86	66	84	......	43	......
22	56	4	......	2	......	90	54	75	2	44	......
23	56	4	......	2	......	81	53	71	3	44	......
24	56	11	......	2	......	64	52	78	3	43	......
25	56	12	......	......	......	63	56	77	41	43	......
26	41	8	......	......	......	52	66	77	69	43	......
27	22	5	......	......	......	45	66	77	54	43	......
28	22	5	......	......	......	44	66	74	61	43	......
29	22	5	......	......	26	44	68	65	62	43	......
30	18	5	1	......	26	46	75	66	62	43	......
31	25	......	2	......	......	47	......	68	62	......	......

NOTE.—Mean discharge Apr. 19–28 estimated 15 second-feet, as recording gage clock stopped. No flow Dec. 22–29, Jan. 5–15, Jan. 25 to Apr. 12, May 2–8, July 14–15, Aug. 4–5, and Aug. 18–21.

Monthly discharge of Logan Northern canal near Logan, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	56	18	27.0	1,660
November	32	4	18.5	1,100
December	12	0	3.23	199
January	2	0	.774	47.6
February	0	0	0	0
March	0	0	0	0
April	....	0	9.33	555
May	90	0	46.9	2,880
June	82	52	68.3	4,060
July	87	0	70.6	4,340
August	69	0	38.7	2,380
September	67	36	47.1	2,800
The year	90	0	27.6	20,000

BLACKSMITH FORK ABOVE UTAH POWER & LIGHT CO.'S DAM, NEAR HYRUM, UTAH.

LOCATION.—In NE. ¼ sec. 8, T. 10 N., R. 2 E., 1 mile above diversion dam, 3½ miles above power plant of Utah Power & Light Co., 6 miles east of Hyrum, Cache County.

DRAINAGE AREA.—About 260 square miles (measured on topographic maps and map of Cache National Forest).

RECORDS AVAILABLE.—July 19, 1900, to December 31, 1902; November 28, 1913, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on left bank 500 feet above wagon bridge and nearly a mile above dam; installed November 28, 1913. Gage at old tollgate in mouth of canyon about 3½ miles downstream was used July 19, 1900, to December 31, 1902. Flow approximately the same at both points. Gage inspected by employee of Utah Power & Light Co.

DISCHARGE MEASUREMENTS.—Made by wading about three-eighths mile above gage, or from cable a quarter of a mile above gage. Conditions at wading section good; at cable poor, especially at high stages.

CHANNEL AND CONTROL.—Bed rough but fairly permanent; one channel at all stages.

EXTREMES OF DISCHARGE.—1913–1916: Maximum stage recorded, 4.65 feet at 4 a. m. April 28, 1916 (discharge, 1,020 second feet); minimum stage, 0.85 foot at 6 a. m. February 6, 1916 (discharge, estimated from an extension of rating curve, 22 second-feet).

ICE.—Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—Above all important diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice December 19, 20, and 22–31, January 1, 2, 17, 18, 21, 22, 28, and 29. Rating curve well defined between 60 and 300 second-feet and fairly well above that. Operation of water-stage recorder satisfactory except that inlet pipe is believed to have been partly clogged from July 19 to September 30. Daily discharge ascertained by applying mean daily gage height to rating table except for ice-affected periods. for which discharge was etimated, and July 19 to September 30, when discharge was obtained from comparison with record of flow at stations on Hyrum canal and Blacksmith Fork below Hyrum canal. See footnote to daily discharge table. Records fair.

Discharge measurements of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	E. A. Porter	1.37	87	Apr. 28	Purton and Dickinson.	4.14	735
Jan. 12	Stoner[a] and Sanford	1.28	66	May 10	L. C. Monson	3.27	513
Mar. 27	L. C. Monson[a]	2.17	213	June 12	do	2.19	220
30	A. B. Purton	2.15	206	July 18	W. E. Dickinson	1.91	153

[a] Utah Power & Light Co. engineer.

NOTE.—Gage heights corrected to true datum.

Daily discharge, in second-feet, of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	81	81	77	66	66	83	214	528	236	161	......	......
2	81	81	76	68	67	83	250	513	230	161	......	......
3	81	81	76	70	69	78	250	498	221	159	......	......
4	81	81	74	70	67	77	261	528	223	159	......	......
5	81	81	74	70	66	87	266	606	226	159	......	......
6	81	81	73	67	67	86	240	606	226	157	......	......
7	81	83	74	67	77	83	226	622	221	157	......	......
8	81	81	74	67	76	81	236	560	214	157	......	......
9	81	81	74	73	73	86	266	544	206	153	......	......
10	81	83	74	70	71	104	328	498	206	153	......	......
11	81	81	74	69	70	118	452	437	206	151	......	......
12	81	80	74	67	69	132	498	392	199	148	......	......
13	81	78	74	69	67	148	407	348	195	148	......	110
14	81	78	74	69	70	140	392	320	190	148	......	116
15	81	80	74	70	69	134	467	301	188	151	......	......
16	81	80	74	70	69	138	513	287	186	151	......	......
17	81	78	74	65	70	161	560	282	181	151	......	......
18	81	78	73	65	70	181	622	279	179	151	......	......
19	81	78	70	71	71	221	513	282	179	......	......	......
20	81	78	70	70	76	269	407	295	181	......	122	......
21	81	80	73	65	78	467	378	284	186	......	......	......
22	81	78	......	65	80	317	392	284	186	......	......	......
23	81	80	......	71	80	312	437	276	179	......	......	......
24	81	78	......	71	81	274	544	271	174	......	......	......
25	80	80	......	71	83	228	638	258	172	......	......	......
26	81	78	......	70	86	214	750	246	170	......	......	......
27	81	78	......	70	87	228	800	238	170	......	......	......
28	80	84	......	69	86	261	900	230	166	......	......	......
29	80	81	......	68	84	236	800	223	166	......	......	......
30	81	80	......	66	......	211	622	233	163	......	......	......
31	81	......	......	66	......	204	......	238	......	......	......	......

NOTE.—Mean discharge estimated on account of ice, Dec. 22–31, 65 second-feet. Inlet pipe partly clogged July 19 to Sept. 30, and mean discharge estimated as follows: July 19–25, 150 second-feet; July 26–31, 148 second-feet; Aug. 1–9, 142 second-feet; Aug. 10–14, 135 second-feet; Aug. 15–19, 130 second-feet; Aug .21–27, 112 second-feet; Aug. 28 to Sept. 12 and Sept. 15–30, 125 second-feet.

Monthly discharge of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	81	80	80.9	4,970
November	84	78	80.0	4,760
December	77	....	71.0	4,370
January	73	65	68.5	4,210
February	87	66	74.0	4,260
March	467	77	176	10,800
April	900	214	454	27,000
May	622	223	371	22,800
June	236	163	194	11,500
July	161	....	152	9,350
August	....	....	129	7,930
September	....	....	124	7,380
The year	900	....	165	119,000

BLACKSMITH FORK AT UTAH POWER & LIGHT CO.'S PLANT NEAR HYRUM, UTAH.

LOCATION.—In sec. 11, T. 10 N., R. 1 E., immediately above wagon bridge, 300 feet above confluence of Utah Power & Light Co.'s tailrace with main stream, 2½ miles east of Hyrum, Cache County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 15, 1914, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by Joseph Appleyard.

DISCHARGE MEASUREMENTS.—Made by wading or from cable at gage.

CHANNEL AND CONTROL.—Bed composed of gravel overgrown with aquatic plants. Concrete cut-off wall about 10 feet below gage forms control.

Extremes of discharge.—1914–1916: Maximum stage, from water-stage recorder, 6.85 feet at 7 a. m., April 28, 1916 (discharge, 852 second-feet); minimum stage, 3.77 feet October 1 and 2, 1915 (discharge, 8 second-feet).

Ice.—Stage-discharge relation not affected by ice, as low-water flow is maintained by springs a short distance above gage.

Diversions.—Water diverted for power development by Utah Power & Light Co. 2½ miles above station is returned to river 300 feet below it. During periods of low water entire flow is diverted and records obtained at gage represent inflow from springs between diversion dam and gage. The Hyrum power canal diverts 300 feet below gage at the mouth of the Utah Power & Light Co. tailrace. Station is above all diversions for irrigation.

Regulation.—See diversions.

Accuracy.—Stage-discharge relation practically permanent; not affected by ice. Rating curve well defined except for extreme low stages. Operation of water-stage recorder satisfactory except for short breaks in record as shown in footnote to table of daily discharge. Daily discharge determined by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records excellent for high stages and good for low stages.

Discharge measurements of Blacksmith Fork at Utah Power & Light Co.'s plant near Hyrum, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	E. A. Porter	3.79	[a] 9.5	Apr. 28	W. E. Dickinson	6.42	673
Jan. 12	Stoner and Sanford	3.82	[b] 8.1	July 18	do	4.08	31.3
Mar. 30	A. B. Purton	4.75	138				

[a] Estimated, 200 feet below station.

[b] Measured 75 feet above station.

Daily discharge, in second-feet, of Blacksmith Fork at Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8	10	10	10	15	16	132	381	143	42	22	10
2	8	10	10	10	15	15	171	348	136	42	22	10
3	8	10	10	10	15	15	171	345	126	38	21	11
4	8	10	10	10	15	14	180	378	122	38	21	11
5	8	10	10	10	15	14	187	412	122	38	26	11
6	8	10	10	10	15	14	160	416	122	37	24	11
7	8	10	10	11	15	14	145	445	118	36	21	11
8	8	10	9	11	15	14	153	381	114	35	20	10
9	8	10	9	11	15	14	180	367	112	34	20	10
10	9	10	9	11	15	15	226	332	108	33	20	10
11	9	10	9	11	15	16	348	304	102	33	18	10
12	9	10	9	10	15	29	398	261	95	33	18	10
13	9	10	9	10	15	53	292	223	91	33	17	14
14	9	10	9	10	15	58	272	199	82	33	16	13
15	9	10	9	10	15	56	332	182	80	31	15	11
16	9	10	9	10	15	62	371	169	75	30	14	11
17	9	10	10	10	16	84	402	162	72	30	13	11
18	10	10	10	10	16	108	460	156	66	31	13	10
19	10	10	10	10	16	143	381	164	63	28	13	10
20	10	10	10	10	16	176	298	162	64	28	13	10
21	10	10	10	11	16	402	281	160	69	27	21	10
22	10	10	10	11	16	307	304	167	69	23	14	11
23	10	10	10	11	16	286	332	162	63	25	13	11
24	10	10	10	14	16	216	430	164	58	26	13	11
25	10	10	10	14	16	162	518	158	56	25	13	11
26	10	10	10	14	17	145	626	149	56	26	13	11
27	10	10	10	15	17	153	698	145	53	24	11	11
28	10	10	10	15	17	185	754	136	49	25	11	11
29	10	10	10	15	17	167	670	132	60	25	11	11
30	10	10	10	15	......	141	452	138	48	23	10	11
31	10	......	10	15	......	132	......	145	......	23	10	......

Note.—Daily discharge interpolated when water-stage recorder was not operating satisfactorily Dec. 4–11, 21–25, Feb. 8–12, and Aug. 14–16.

Monthly discharge of Blacksmith Fork at Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	10	8	9.16	563
November	10	10	10.0	595
December	10	9	9.71	597
January	15	10	11.5	707
February	17	15	15.6	897
March	402	14	104	6,400
April	754	132	344	20,500
May	445	132	240	14,800
June	143	48	86.5	5,150
July	42	23	30.8	1,890
August	26	10	16.4	1,010
September	14	10	10.8	643
The year	754	8	73.9	53,800

BLACKSMITH FORK BELOW UTAH POWER & LIGHT CO.'S PLANT NEAR HYRUM, UTAH.

Location.—In sec. 2, T. 10 N., R. 2 E., 600 or 700 feet below heading of Hyrum power canal and mouth of Utah Power & Light Co.'s tailrace, and about 2½ miles east of Hyrum, Cache County.

Drainage area.—Not measured.

Records available.—July 19, 1900, to December 31, 1902; May 16, 1904, to December 31, 1910; April 15, 1914, to September 30, 1916.

Gage.—Stevens continuous water-stage recorder on right bank, installed April 15, 1915. Gage used 1904–1910 was vertical staff about 300 feet above present site and at different datum. Gage inspected by Joseph Appleyard.

Discharge measurements.—Made by wading at various sections or from cable about 100 feet below gage. Conditions for measuring poor and there are many springs along this section of the river.

Channel and control.—Bed composed of gravel and boulders; steep. Banks low and covered with willows, but probably not overflowed except during extraordinary floods. Concrete wall about 10 feet below gage acts as control. Stage of zero flow 4.4 feet until control wall was undermined during the spring, altering the stage-discharge relation.

Extremes of discharge.—Maximum stage recorded during year, 7.58 feet at 7 a. m. April 28 (discharge, 921 second-feet); minimum stage, 4.49 feet October 15 and 16 (discharge, 2 second-feet).

1904–1910 and 1914–1916: Maximum stage recorded, 6.8 feet April 16, 1907 (discharge, 1,810 second-feet); minimum stage, 4.49 feet October 15 and 16, 1915 (discharge 2 second-feet). New datum in 1915. See "Gage."

Ice.—Stage-discharge relation not usually affected by ice, on account of springs in the vicinity.

Diversions.—Water diverted above station by Hyrum power canal is returned to river about a quarter of a mile downstream. The Utah Power & Light Co. diverts about 2½ miles upstream, but the tailrace of this plant enters just above head of Hyrum canal.

Regulation.—Flow at gage affected by operation of the two plants.

Accuracy.—Stage-discharge relation not permanent, as cut-off wall forming control was undermined. Two rating curves, fairly well defined except for stages below 20 second-feet, used, respectively, October 1 to April 27, and April 28 to September 30. Stage of zero flow definitely fixed until the high water in April. Operation of water-stage recorder good. Daily discharge determined by applying to rating tables mean daily gage height obtained by inspecting recording gage graph. Records good.

Discharge measurements of Blacksmith Fork below Utah Power & Light Co.'s plant near Hyrum, Utah, during the year ended Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	E. A. Porter	4.54	2.8	Apr. 28	Dickinson and Purton	7.38	798
Jan. 12	Stoner and Sanford	4.71	12.6	July 18	W. E. Dickinson	5.31	88
Mar. 30	A. B. Purton	6.04	206				

Daily discharge, in second-feet, of Blacksmith Fork below Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	10	3	3	5	3	73	212	563	252	150	79	45
2	10	3	3	6	3	71	253	538	252	150	79	45
3	10	3	3	6	10	71	253	538	238	150	79	45
4	10	3	3	6	43	73	253	563	238	150	80	45
5	10	3	3	5	32	83	268	614	238	150	83	45
6	10	3	4	4	34	84	239	614	238	150	82	44
7	10	3	4	4	39	81	225	640	226	150	80	45
8	10	4	4	4	39	80	225	588	226	150	75	44
9	5	4	4	10	53	83	268	588	213	150	70	43
10	2	4	4	14	64	86	336	538	213	141	69	43
11	2	4	4	13	64	86	481	490	213	141	68	43
12	2	3	4	12	61	92	554	445	202	141	68	43
13	2	3	5	13	60	115	458	404	213	141	69	34
14	2	3	5	12	62	124	436	365	202	141	67	36
15	2	3	4	14	62	115	529	347	202	116	66	40
16	2	3	4	11	62	124	554	329	202	90	66	43
17	2	3	4	5	62	143	607	312	190	88	66	44
18	2	3	4	8	65	164	634	312	180	90	66	43
19	2	3	3	14	65	199	529	312	190	87	65	42
20	2	3	3	13	67	268	415	312	190	87	60	41
21	2	4	3	10	67	481	374	312	190	86	51	41
22	3	4	3	10	70	355	394	312	190	83	49	40
23	4	4	3	13	70	355	436	296	190	83	49	42
24	4	4	3	6	70	301	529	296	180	83	48	40
25	4	4	3	3	70	239	634	281	180	83	48	40
26	4	4	3	3	76	212	748	266	169	83	48	40
27	4	4	3	3	77	225	778	252	169	82	50	39
28	4	3	4	3	76	268	840	238	160	82	45	39
29	4	5	4	3	73	239	810	238	160	82	45	38
30	3	4	4	3	......	225	640	252	160	81	45	38
31	3	......	4	3	......	199	......	252	......	80	45	......

Monthly discharge of Blacksmith Fork below Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	10	2	4.71	290
November	5	3	3.47	206
December	5	3	3.61	222
January	14	3	7.71	474
February	77	3	55.1	3,170
March	481	71	171	10,500
April	840	212	464	27,600
May	640	238	400	24,600
June	252	160	202	12,000
July	150	80	114	7,010
August	83	45	63.2	3,890
September	45	34	41.7	2,480
The year	840	2	127	92,400

HYRUM CITY POWER CANAL NEAR HYRUM, UTAH.

LOCATION.—In sec. 2, T. 10 N., R. 1 E., 300 feet below head of canal, which diverts immediately below confluence of Utah Power & Light Co.'s tailrace with river, 2½ miles east of Hyrum, Cache County.

RECORDS AVAILABLE.—1904 to 1910 and April 15, 1914, to September 30, 1916. Records from 1904 to 1910 were published under head "Blacksmith Fork (or Hyrum) power-plant race near Hyrum, Utah."

GAGE.—Stevens continuous water-stage recorder on right bank immediately below footbridge; inspected by Joseph Appleyard. Gage used 1904–1910 was vertical staff at about same site but different datum.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of earth and gravel. Right bank covered with willows. Control not clearly defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.17 feet September 30 (discharge, 96 second-feet); canal dry at times during year.

1904–1910, 1914–1916: Maximum stage recorded, 6.5 feet April 3, 1915 (discharge, 128 second-feet); canal dry at times during 1916.

ICE.—Stage-discharge relation not seriously affected by ice; open water rating curve applicable throughout the winter.

DIVERSIONS.—None.

REGULATION.—Flow regulated by gates at head of canal.

ACCURACY.—Stage-discharge relation permanent; affected May 8 to July 14 by check dam used for irrigation. Rating curve well defined for normal flow of canal but poorly defined for extremely low stages. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph or by averaging hourly discharge for days when stage fluctuated considerably. Records for high stages good.

Canal diverts water from left side of Blacksmith Fork in sec. 2, T. 10 N., R. 1 E., immediately below tailrace of Utah Power & Light Co. Water used for power development at Hyrum city power plant and returned to the river.

Discharge measurements of Hyrum city power canal near Hyrum, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	E. A. Porter	5.96	80	Apr. 28	A. B. Purton	4.42	7.6
Dec. 1	Stoner and Sanford	5.61	53	July 18	W. E. Dickinson	5.94	79
Mar. 30	A. B. Purton	3.93	3.8				

Daily discharge, in second-feet, of Hyrum City power canal near Hyrum, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	July.	Aug.	Sept.
1	68	76	64	51	64	......	3	8	......	76	94
2	68	76	66	77	68	......	5	8	......	75	92
3	68	76	69	66	60	......	6	10	......	75	92
4	71	76	69	72	20	......	6	10	......	74	90
5	70	77	69	67	31	......	6	10	......	74	92
6	70	78	70	65	31	......	6	10	......	73	90
7	70	79	70	61	31	......	6	10	......	71	92
8	73	78	70	69	32	......	6	......	......	77	90
9	76	77	69	64	12	......	6	......	......	84	90
10	80	83	69	54	......	......	6	......	......	81	92
11	80	76	68	53	......	......	8	......	......	78	93
12	80	77	71	52	......	......	......	......	......	76	94
13	80	76	69	54	......	......	......	......	......	75	86
14	80	72	69	55	......	......	......	......	......	72	90
15	80	76	69	56	......	......	......	......	40	74	93
16	80	78	66	56	......	......	......	......	80	76	94
17	80	74	71	49	......	......	......	......	77	75	94
18	80	74	63	50	......	......	......	......	76	74	94
19	80	74	58	54	......	......	......	......	78	76	93
20	79	75	64	55	......	......	......	......	80	76	91
21	77	76	68	53	......	......	......	......	80	76	92
22	79	77	69	54	......	......	......	......	80	79	92
23	80	74	72	56	......	......	......	......	79	76	93
24	80	76	69	66	......	......	1	......	79	76	93
25	79	74	68	70	......	......	6	......	78	77	93
26	77	74	70	70	......	......	8	......	78	76	93
27	78	76	55	63	......	......	8	......	78	76	93
28	78	73	63	65	......	1	8	......	78	92	93
29	76	65	68	63	......	2	8	......	78	92	94
30	76	65	59	65	......	3	8	......	78	94	96
31	75	......	42	65	......	3	......	......	76	93	......

NOTE.—Discharge interpolated Oct. 8 and 14. No flow Feb. 10 to Mar. 27 and April 12 to 23. May 8 to July 14, a check dam across canal for irrigation, "a small irrigating stream in the canal for part of the time."

Monthly discharge of Hyrum City power canal near Hyrum, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	80	68	76.4	4,700
November	83	65	75.3	4,480
December	72	42	66.3	4,080
January	77	49	60.3	3,710
February	68	....	12.0	690
March	3	....	.290	18
April	8	....	3.70	220
May 1-7	10	8	9.43	131
July 15-31	80	40	76.1	2,560
August	94	71	78.0	4,800
September	96	86	92.3	5,490

WEST SIDE CANAL NEAR COLLINSTON, UTAH.

LOCATION.—In NW. ¼ sec. 34, T. 13 N., R. 2 W., at Wheelon siding on Oregon Short Line Railroad, about 600 feet below penstock of Utah Power & Light Co., Wheelon plant, 1,000 feet northwest of gaging station on Bear River and 4 miles north of Collinston, Boxelder County.

RECORDS AVAILABLE.—June 1, 1912, to September 30, 1916.

GAGE.—Friez water-stage recorder on left bank installed May 22, 1914, at same site and datum as inclined gage used prior to that time. Gage inspected by H. G. Stone.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of earth and gravel. Banks steep and clean. Control not well defined; stage-discharge relation probably affected by vegetal growth and slight silt deposit.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.4 feet August 30 (discharge, 532 second-feet); canal dry at various times.

1912–1916: Maximum stage recorded, 7.86 feet July 1, 1912 (discharge, 563 second-feet); canal dry at various times in 1913, 1915, and 1916.

ICE.—Stage-discharge relation seriously affected at times by ice.

DIVERSIONS.—Water is taken out of canal, about 600 feet above gage, for the power plant, and, if necessary, water can also be siphoned across the river to Hammond ditch.

REGULATION.—Flow can be regulated at headgates and also at fore bay of power plant.

ACCURACY.—Stage-discharge relation not permanent; changed by cleaning of canal and later by silting and vegetal growth. Rating curves fairly well defined between 0 and 500 second-feet. Water-stage recorder operated satisfactorily except for short periods when staff gage readings were secured. Recorder not in operation from December 23 to May 10. Daily discharge determined by applying mean daily gage height to rating tables. Records good except during winter, for which they are poor.

COOPERATION.—Record of mean daily gage height and part of discharge measurements furnished by Utah Power & Light Co.

Canal diverts water from west side of Bear River in the SW. ¼ sec. 23, T. 13 N., R. 2 W., by means of a low diversion dam. Part of the water is used through the Wheelon plant of the Utah Power & Light Co. about 1½ miles below; the rest of that which passes the gaging station is used for irrigation on west side of river. When cleaning or repairing Hammond canal in the canyon water can be siphoned across the river at the power plant from West Side canal.

Discharge measurements of West Side canal near Collinston, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 13	L. C. Monson[a]	2.26	36.3	June 13	L. C. Monson	7.00	478
May 11	.....do	3.95	151	July 17	W. E. Dickinson	7.20	506

[a] Engineer, Utah Power & Light Co.

Daily discharge, in second-feet, of West Side canal near Collinston, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	168	86	......	......	6	......	......	299	493	512	493
2	148	86	......	......	6	......	......	418	503	511	470
3	140	80	......	......	6	......	......	355	512	507	447
4	134	73	......	......	6	......	......	367	506	507	444
5	148	74	......	......	6	......	37	407	512	503	448
6	144	66	......	......	6	......	64	430	512	499	454
7	139	68	......	......	6	......	105	443	503	503	469
8	140	76	35	......	6	......	99	473	506	499	482
9	144	72	33	......	6	......	111	472	503	503	473
10	136	62	......	......	6	......	140	477	506	486	459
11	138	59	......	......	6	......	140	464	499	495	461
12	144	78	......	31	7	......	155	455	519	496	451
13	144	62	......	15	6	......	178	476	508	493	428
14	136	60	......	6	6	......	190	470	508	484	418
15	135	54	......	......	......	......	210	467	464	482	417
16	138	50	......	......	......	37	234	478	467	480	394
17	99	50	......	4	......	37	162	382	493	474	390
18	103	......	......	7	......	15	353	493	493	484	373
19	98	......	......	7	......	23	374	508	482	491	343
20	99	......	......	7	......	23	394	510	468	485	360
21	99	......	......	7	......	......	404	428	486	486	336
22	82	......	......	6	......	......	324	354	490	464	306
23	84	......	......	6	......	......	411	386	493	467	305
24	83	......	......	6	......	......	289	428	494	469	271
25	86	......	......	6	......	......	162	428	496	493	233
26	85	......	......	6	......	......	122	428	524	512	235
27	85	......	......	6	......	......	253	428	522	529	242
28	85	......	......	6	......	......	320	454	516	525	234
29	87	......	......	6	......	......	221	460	500	515	240
30	87	......	......	......	......	......	290	506	498	532	240
31	88	......	......	......	......	......	289	......	507	519	......

NOTE.—Mean discharge estimated, as follows, as stage-discharge relation is believed to have been affected by ice; Nov. 18 to Dec. 7, 45 second-feet; Dec. 10 to Feb. 11, 35 second-feet. No flow in canal Feb. 15–16, Mar. 15 to Apr. 15, and Apr. 21 to May 4.

Monthly discharge of West Side canal near Collinston, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	168	82	117	7,190
November	86	......	58.0	3,450
December	......	......	37.2	2,290
January	......	......	35.0	2,150
February	......	0	17.8	1,020
March	7	0	2.74	168
April	37	0	4.50	268
May	411	0	195	12,000
June	510	299	438	26,100
July	524	464	499	30,700
August	532	464	497	30,600
September	493	233	377	22,400
The year	532	0	190	138,000

NOTE.—See note to table of daily discharge.

HAMMOND (EAST SIDE) CANAL NEAR COLLINSTON, UTAH.

LOCATION.—In NW. ¼ sec. 34, T. 13 N., R. 2 W., at Wheelon siding on Oregon Short Line Railroad, about 400 feet below penstock of Utah Power & Light Co. and 4 miles north of Collinston, Boxelder County.

RECORDS AVAILABLE.—June 1, 1912, to September 30, 1916.

GAGE.—Friez water-stage recorder on right bank, installed May 22, 1914, at same site and datum as inclined staff used until that date; inspected by H. G. Stone.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of earth and gravel. Control not well defined. Canal subject to small slides, which no doubt affect stage-discharge relation.

EXTREMES OF DISCHARGE.—1912–1916: Maximum stage occurred in 1916. See monthly discharge table. Mean daily discharge only is available.

WINTER FLOW.—No record during the winter.

DIVERSIONS.—Water taken from this canal about 400 feet above gage for power plant.

REGULATION.—Flow can be regulated at headgates and by means of a wasteway at power plant fore bay; is also affected by operation of plant.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined for range in stage effective during year. Mean daily gage height obtained from water-stage recorder graph. October 16–22 and May 10–27 staff gage was read. Daily discharge determined by applying mean daily gage height to rating table. Records good.

COOPERATION.—Record of mean daily gage height and part of discharge measurements furnished by Utah Power & Light Co.

Canal diverts water on the east side of Bear River in the SW. ¼ sec. 23, T. 13 N., R. 2 W., at the same diversion dam as West Side canal. Part of the water is used by the Wheelon plant of the Utah Power & Light Co. and the rest is either wasted into the river or passes the gaging station for use in irrigation.

Discharge measurements of Hammond (East Side) canal near Collinston, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 27[a]	Purton and Dickinson	0.96	[b] 0.05	June 13	L. C. Monson	4.20	97
May 11	L. C. Monson [c]	4.20	102	July 17	W. E. Dickinson	4.52	115

[a] Slide into canal, 800 feet below gage. [b] Estimated. [c] Engineer, Utah Power & Light Co.

Daily discharge, in second-feet, of Hammond (East Side) canal near Collinston, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	May.	June.	July.	Aug.	Sept.
1	16	5.1		72	86	117	118
2	16	5.7		83	86	116	128
3	16	5.7	0	83	86	116	125
4	16	4.5	36	82	86	116	124
5	17	3.9	24	82	89	118	123
6	17	4.5	37	85	91	102	121
7	17	5.4	45	88	93	99	120
8	17	5.4	69	94	94	99	122
9	16	5.4	76	92	98	100	126
10	15	5.2	84	94	102	100	124
11	15	5.2	73	97	104	101	117
12	16	2.0	107	98	113	102	113
13	16	3.0	106	98	114	114	112
14	15	4.2	0	98	115	99	106
15	10	4.0	0	98	114	100	102
16	15	4.0	0	96	112	117	106
17	15	2.0	0	97	112	118	106
18	4.5	0	9.0	98	112	120	102
19	4.5		44	97	116	122	100
20	4.5		76	99	114	120	100
21	4.5		82	92	110	118	101
22	4.5		73	84	114	120	100
23	4.5		83	81	114	120	100
24	4.2		88	82	116	118	71
25	3.9		90	81	118	116	26
26	3.9		74	80	118	118	25
27	3.9		74	82	120	117	25
28	4.2		54	82	118	117	25
29	4.2		6.2	84	118	116	25
30	4.2		8.1	84	116	118	32
31	4.5		22		116	118	

NOTE.—Canal reported dry during the winter.

Monthly discharge of Hammond (East Side) canal near Collinston, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	17	3.9	10.5	646
November 1-18	5.7	0	4.18	149
May 3-21	107	0	49.7	2,860
June	99	72	88.8	5,280
July	120	86	107	6,580
August	122	99	113	6,950
September	128	25	94.2	5,610

WEBER RIVER BASIN.

WEBER RIVER NEAR OAKLEY, UTAH.

LOCATION.—In NE. ¼ sec. 15, T. 1 S., R. 6 E., near mouth of canyon about 3 miles above Oakley, Summit County. South Fork of Weber River enters 2 miles above station, and Beaver or Kamas Creek 6 miles below.

DRAINAGE AREA.—163 square miles.

RECORDS AVAILABLE.—October 22, 1904, to September 30, 1916.

GAGE.—Inclined staff on left bank about a quarter of a mile above the upper ditch diverting from Weber River. Read by John Franson.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; steep and rough but apparently fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.0 feet June 13 (discharge, 1,940 second-feet); minimum discharge not determined.

1904–1916: Maximum stage recorded, 8.5 feet July 6, 1907, and June 5–7, 1909 (discharge, 4,010 second-feet); minimum stage, 4.0 feet for periods during February and March, 1908 (discharge, 46 second-feet).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—None above station but several canals take out below for irrigation use around Oakley and between Oakley and Kamas.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent; affected by ice November 10-19. November 28 to December 4, and December 17 to March 10. Rating curve fairly well defined above 200 second-feet and poorly defined below. Gage read to half tenths once daily except during winter when it was read about twice a week. Daily discharge ascertained by applying daily gage height to rating table except for period when stage-discharge relation was affected by ice. Records obtained by use of rating table for stages above 200 second-feet good; others fair.

Discharge measurements of Weber River near Oakley, Utah, during the year ending Sept. 30, 1916.

[Made by W. E. Dickinson.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
April 19	4.85	288
July 26	4.42	128

Daily discharge, in second-feet, of Weber River near Oakley, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	102	75			124	549	1,240	674	135	92
2	92	75			135	519	995	642	124	92
3	92	75			135	579	846	579	124	92
4	92	75			148	642	1,080	519	124	92
5	92	75	102		148	775	1,420	462	227	84
6	92	75	102		148	919	1,620	408	192	84
7	92	75	102		161	1,160	1,420	358	176	84
8	92	75	92		161	1,160	1,520	358	161	84
9	84	75	92		161	1,240	1,720	358	148	92
10	84		92		176	1,080	1,830	334	148	84
11	84		92	75	176	995	1,830	311	135	84
12	84		92	75	192	846	1,620	289	135	75
13	84		92	75	210	775	1,940	267	124	75
14	84		92	75	227	707	1,830	247	124	75
15	84		92	80	247	642	1,830	247	124	75
16	84		92	84	289	579	1,830	267	124	75
17	84			88	334	549	1,720	247	124	75
18	75			92	408	549	1,620	227	124	75
19	75			102	358	579	1,420	192	112	75
20	75	112		124	267	610	1,340	176	102	75
21	75	112		161	267	642	1,080	176	102	75
22	75	112		192	267	642	995	161	102	75
23	75	112		161	289	642	775	155	102	75
24	75	112		161	358	579	846	150	102	75
25	75	112		148	408	519	846	145	102	75
26	75	112		148	490	462	846	140	92	75
27	75	112		135	579	462	846	102	92	75
28	75			124	741	519	810	102	92	75
29	75			124	775	642	810	92	92	75
30	75			124	642	846	707	135	92	75
31	75			124		1,160		135	92	

NOTE.—Mean discharge estimated on account of ice as follows: Nov. 10–19, 85 second-feet; Nov. 28–30, 105 second-feet; Dec. 1–4, 100 second-feet; Dec. 17–31, 85 second-feet; Jan. 1 to Feb. 5, 65 second-feet; Feb. 6 to Mar. 10, 70 second-feet.

Monthly discharge of Weber River near Oakley, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet.)
	Maximum.	Minimum.	Mean.	
October	102	75	82.3	5,060
November	112	75	91.2	5,430
December			90.6	5,570
January			65.0	4,000
February			69.2	3,980
March	192		102	6,270
April	775	124	301	17,900
May	1,240	519	728	44,800
June	1,940	707	1,310	78,000
July	674	92	279	17,200
August	227	92	124	7,620
September	92	75	79.6	4,740
The year	1,940		276	201,000

WEBER RIVER AT DEVILS SLIDE, UTAH.

LOCATION.—In SW. ¼ sec. 19, T. 4 N., R. 4 E., about 300 feet north of hotel and 500 feet downstream from highway bridge at Devils Slide, Morgan County. Lost Creek enters from the right a quarter of a mile above the station.

DRAINAGE AREA.—1,090 square miles.

RECORDS AVAILABLE.—February 1, 1905, to September 30, 1916.

GAGE.—Vertical staff on left bank just above cable, installed September 21, 1915, at same site and datum as inclined staff used March 9, 1912, to September 20, 1915. Original gage used February 1, 1905, to March 8, 1912, was an inclined staff at same datum, but on opposite bank of river. Read by A. E. Lucas.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

Channel and control.—Bed composed of gravel and sand; shifts occasionally. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 5.65 feet March 21, April 29, and May 7 (discharge, 2,970 second-feet); minimum stage, 2.075 feet September 7 and 8 (discharge, 104 second-feet).

1905–1916: Maximum stage recorded, 7.0 feet May 28 and June 4–8, 1909 (discharge, 5,120 second-feet); minimum discharge, 48 second-feet, September 7 and 8, 1915 (stage 1.78 feet).

Ice.—Stream does not freeze at this point, but there is occasionally a little shore ice; stage-discharge relation not seriously affected.

Diversions.—A number of canals divert water from Weber River and tributaries in the vicinity of Oakley and Kamas for irrigation and domestic use.

Regulation.—None, other than diversions for irrigation.

Accuracy.—Stage-discharge relation permanent throughout the year; not affected by ice. Rating curve well defined between 50 and 1,500 second-feet and fairly well defined up to 3,000 second-feet. Gage read to quarter tenths once a day. Daily discharge ascertained by applying daily gage reading to rating table. Records good.

Discharge measurements of Weber River at Devils Slide, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 20	L. W. Jordan	2.30	164
Apr. 20	W. E. Dickinson	4.10	1,230
July 27	.....do	2.34	170

Daily discharge, in second-feet, of Weber River at Devils Slide, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	149	135	195	141	163	141	717	1,970	1,430	559	189	130
2	149	135	157	163	179	157	1,020	1,860	1,330	503	189	130
3	141	141	179	195	195	157	979	1,860	1,150	450	195	130
4	149	141	202	179	212	202	861	2,080	1,330	450	202	122
5	157	149	230	169	202	309	861	2,430	1,530	400	559	115
6	157	141	223	179	212	288	751	2,670	1,640	353	400	110
7	149	179	202	169	202	268	683	2,910	1,750	309	400	106
8	149	163	169	157	212	268	717	2,790	1,750	309	331	106
9	149	163	189	212	195	268	823	2,730	1,860	268	309	110
10	141	179	189	195	212	376	979	2,670	1,860	268	288	115
11	141	163	179	169	212	425	1,530	2,430	1,970	249	268	157
12	149	149	179	179	212	450	1,430	2,190	1,860	223	268	149
13	149	157	169	179	196	531	1,150	1,970	1,860	202	249	141
14	149	157	195	179	179	503	1,240	1,640	1,970	202	230	141
15	149	223	179	179	179	503	1,430	1,430	1,970	223	230	149
16	141	212	130	195	189	559	1,430	1,330	1,860	309	230	141
17	149	157	122	189	189	651	1,640	1,150	1,860	288	223	135
18	149	202	122	163	189	823	1,750	1,110	1,750	249	195	135
19	149	223	115	179	179	979	1,530	1,060	1,750	230	169	135
20	149	249	149	169	179	1,430	1,330	1,150	1,640	223	169	135
21	149	230	163	163	179	2,910	1,240	1,150	1,330	223	179	130
22	149	230	202	179	212	1,750	1,150	1,150	1,150	202	166	135
23	141	202	230	195	212	1,970	1,240	1,150	979	195	163	157
24	141	202	195	195	212	1,150	1,530	1,060	939	189	157	149
25	141	149	169	189	195	787	1,750	1,020	899	223	149	149
26	141	195	169	179	189	823	1,970	979	899	195	149	149
27	149	179	130	163	223	899	2,430	899	823	176	149	149
28	149	141	141	169	189	1,060	2,790	861	787	179	135	149
29	149	169	149	157	163	924	2,910	899	683	195	135	149
30	149	212	141	149	......	787	2,430	1,060	619	195	141	141
31	141	......	135	156	......	651	......	1,330	......	195	135	......

Monthly discharge of Weber River at Devils Slide, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	157	141	147	9,040
November	249	135	178	10,600
December	230	115	171	10,500
January	212	141	175	10,800
February	223	163	195	11,200
March	2,910	141	742	45,600
April	2,910	683	1,480	88,100
May	2,910	861	1,640	101,000
June	1,970	619	1,440	85,700
July	559	176	272	16,700
August	559	135	224	13,800
September	157	106	135	8,030
The year	2,910	106	566	411,000

WEBER RIVER NEAR PLAIN CITY, UTAH.

LOCATION.—In SE. ¼ sec. 5, T. 6 N., R. 2 W., at county highway bridge on road to Ogden, Weber County, a mile from Plain City, about a mile below mouth of Fourmile Creek, 2 miles below Mill Creek, 6 miles below Ogden River, and 6 miles above point where Weber River flows into Great Salt Lake.

DRAINAGE AREA.—2,060 square miles.

RECORDS AVAILABLE.—May 14, 1905, to September 30, 1916. Records were obtained at this point in 1904 by the State engineer of Utah.

GAGE.—Chain gage on upstream side of highway bridge installed November 12, 1914, at same datum as old gage. Gage used 1904 to November 11, 1914, was painted on upstream side of middle pier of bridge. Gage read by W. E. Davies.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading. Conditions fair.

CHANNEL AND CONTROL.—Bed composed of sand and mud. Shifting. One channel at all stages; banks high.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 18.7 feet at 6 a. m. March 22 (discharge, 6,730 second-feet); water standing in pools July 30 to August 4. Stage below 2.0 feet.

1904–1916: Maximum stage recorded, 19.1 feet June 6, 1909 (discharge, 7,580 second-feet); water standing in pools July 14 and 15, 1915, and July 30 to August 4, 1916. Stage below 2.0 feet.

ICE.—River occasionally freezes over during very cold weather. Discharge for such periods determined by comparison with record of flow at Devils Slide.

DIVERSION.—In the summer practically the entire flow of Weber River above this station is used for irrigation.

REGULATION.—Flow affected by diversions.

ACCURACY.—Stage-discharge relation not permanent for stages below 10 feet; affected by ice during winter. Rating curves fairly-well defined except that below 50 second-feet they may be considerably in error. Gage read to quarter-tenths once a day. Daily discharge determined by applying daily gage height to rating tables, except for ice-affected periods and days in August and September when water did not reach gage. Records fair.

Discharge measurements of Weber River near Plain City, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan 21	L. W. Jordan	[a] 6.12	388
Apr. 11	Jordan and Dickinson	14.00	3,470
June 26	A. B. Purton	6.30	877

[a] Stage discharge relation affected by ice.

Daily discharge, in second-feet, of Weber River near Plain City, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	256	228	374	......	......	709	2,720	5,530	1,660	277	0	......
2	256	228	351	......	......	653	3,320	4,640	1,800	277	0	......
3	237	220	351	......	......	653	3,510	4,250	1,630	277	0	......
4	237	220	374	......	......	653	3,100	4,020	1,530	159	0	......
5	237	220	398	......	......	1,000	2,960	4,500	1,600	159	50	......
6	237	220	398	446	599	1,260	2,720	4,920	1,730	88	224	......
7	246	285	422	422	653	1,070	2,500	4,440	1,900	42	224	......
8	246	306	374	374	709	1,000	2,470	5,370	1,800	31	191	......
9	256	265	374	398	681	973	2,640	5,300	2,030	31	159	......
10	265	328	374	......	737	1,220	2,960	4,640	1,860	31	129	......
11	256	374	398	......	709	1,560	3,650	4,250	1,800	30	101	......
12	246	306	398	......	681	1,820	3,700	3,700	1,900	20	63	......
13	202	328	374	......	653	2,060	3,960	3,240	1,860	10	29	......
14	211	328	374	......	626	2,200	3,550	3,030	1,760	10	29	......
15	202	328	398	......	599	1,990	3,650	2,750	1,730	10	......	......
16	220	328	422	......	599	2,060	3,850	2,500	1,630	52	......	......
17	228	351	398	......	626	2,300	4,250	2,370	1,600	47	......	......
18	237	351	374	......	626	2,860	4,640	2,230	1,560	41	......	......
19	237	374	351	......	599	3,320	4,710	2,200	1,500	41	......	......
20	246	374	351	......	626	4,500	3,910	2,370	1,470	41	......	......
21	237	398	374	388	653	5,940	3,460	2,330	1,470	41	......	......
22	237	446	422	......	681	6,460	3,140	2,300	1,500	33	......	15
23	237	446	446	......	681	6,200	3,030	2,130	1,370	30	......	25
24	228	446	471	......	653	5,860	3,170	2,060	1,000	25	......	39
25	237	374	471	......	681	4,380	3,600	1,990	970	20	......	39
26	237	328	422	496	709	3,460	4,380	1,900	882	20	......	49
27	237	374	398	446	737	3,510	5,220	1,700	711	20	......	61
28	237	422	......	......	795	3,650	5,700	1,700	655	20	......	61
29	237	328	......	......	766	3,600	6,030	1,470	548	20	......	61
30	237	374	......	......	......	3,240	6,030	1,470	379	0	......	61
31	237	......	......	......	......	3,030	......	1,560	......	0	......	......

NOTE.—Discharge estimated on account of ice as follows: Dec. 28–31, 350 second-feet; Jan. 1–5, 375 second-feet; Jan. 10–20, 420 second-feet; Jan. 22–25, 435 second-feet; Jan. 28–31, 385 second-feet; Feb. 1–5, 460 second-feet. Discharge estimated as water did not reach gage, Aug. 5; mean flow Aug. 15 to Sept. 21, 10 second-feet; Sept. 22 and 23.

Monthly discharge of Weber River near Plain City, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	265	202	257	15,800
November	446	220	330	19,600
December	471	....	388	23,900
January	....	....	411	25,300
February	795	....	634	36,500
March	6,460	653	2,680	165,000
April	6,030	2,470	3,750	223,000
May	5,530	1,470	3,120	192,000
June	2,030	379	1,460	86,900
July	277	0	61.4	3,780
August	224	0	44.2	2,720
September	61	....	20.7	1,230
The year	6,460	0	1,100	795,000

JORDAN RIVER BASIN.

JORDAN RIVER NEAR LEHI, UTAH.

LOCATION.—In sec. 25, T. 5 S., R. 1 W., about 800 feet below pump house at outlet of Utah Lake and 4 miles southwest of Lehi, Utah County.

DRAINAGE AREA.—2,570 square miles.

RECORDS AVAILABLE.—May 30 to December 31, 1904; July 22, 1913, to September 30, 1916.

GAGE.—Vertical staff in stilling well on right bank about 25 feet above bridge January 6, 1914, to September 30, 1916; read by W. A. Knight. Gage used May 30 to December 31, 1904, and July 22, 1913, to January 5, 1914, was vertical staff nailed to upstream side of right bridge abutment; same datum 1904-1916.

DISCHARGE MEASUREMENTS.—Made from cable about 400 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of clay and hardpan. Banks clean and low; not subject to overflow. One channel at the gage. Area slightly constricted below by highway bridge. Slope is very flat and stage-discharge relation may be slightly affected when flashboards are placed on the old impounding dam in Jordan Narrows, 6 miles north of the station (12 miles by river).

EXTREMES OF DISCHARGE.—Maximum stage during year, 5.50 feet, July 25, with pumps running (discharge, 755 second-feet). Minimum stage occurred at 6 p. m. on December 15 when river was dry due to a strong north wind which blew the water in the lake away from the outlet gates.

1904, 1913–1916: Maximum stage recorded, 5.78 feet May 31, 1914 (discharge, 794 second-feet); minimum stage occurred at 6 p. m. December 15, 1915, when river was dry.

ICE.—Stage-discharge relation seldom seriously affected by ice. During unusually cold weather, however, the river sometimes freezes over below station and the open-channel rating is not applicable.

DIVERSIONS.—None above the station. In the Narrows about 6 miles north (several miles farther by river) a number of large canals divert for irrigation in Salt Lake Valley and for use by the smelters, etc., in the vicinity of Garfield.

REGULATIONS.—During the irrigation season, when the natural flow from Utah Lake is inadequate for the demands below, water is pumped from the lake into Jordan River. A pumping plant with a capacity of about 800 cubic-feet per second is at outlet of lake, 800 feet above gage, and is owned and operated by various canal companies interested in the stream.

ACCURACY.—Stage-discharge relation not permanent, because of slight shifts in control, variable effect of wind on both river and lake, increased velocities due perhaps to pumping, and possible backwater from flashboards on dam at Jordan Narrows. There seem to be in general two conditions of stage-discharge relation—one existing when the river is fed by gravity flow from the lake with the check gates wide open, and the other when the pumps are in operation and the check gates closed. No ice effect during the year. Four fairly well defined rating curves used. Gage read to hundredths twice daily. Daily discharge determined by applying mean daily gage height to rating table. Records fair. Wind effect serious and the amount uncertain; discharge for windy days may be considerably in error, but total discharge is probably not seriously affected.

Discharge measurements of Jordan River near Lehi, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	A. B. Purton	2.76	226	June 24	A. B. Purton	5.00	651
Nov. 6	do	2.25	156	Sept. 23	J. J. Sanford	4.36	469
Feb. 7	J. J. Sanford	2.30	168	29	do	3.81	367
Apr. 14	W. E. Dickinson	4.45	509	29	do	3.81	378
14	L. W. Jordan	[a]4.40	398				

[a] Strong wind upstream affected stage-discharge relation.

Daily discharge, in second-feet, of Jordan River near Lehi, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	284	230	99	35	144	354	485	570	570	650	726	652
2	254	206	100	35	147	356	428	568	570	650	726	650
3	234	159	101	38	149	361	492	574	568	650	726	648
4	233	156	102	42	152	356	494	582	567	648	724	646
5	234	156	103	45	154	379	392	586	550	658	692	646
6	233	156	105	46	157	385	500	487	534	682	660	646
7	238	156	107	46	162	383	502	487	563	688	688	650
8	231	156	105	48	163	383	464	588	559	688	688	652
9	230	156	98	54	184	387	506	586	557	688	688	646
10	233	156	93	57	212	387	504	588	555	686	688	642
11	231	141	93	62	255	383	508	464	553	684	688	628
12	231	114	93	70	286	385	500	589	550	682	688	594
13	230	114	93	80	286	329	466	589	540	702	686	586
14	230	90	63	90	291	385	512	597	540	702	690	582
15	233	86	28	88	296	388	513	591	690	704	690	580
16	231	82	108	94	301	392	716	591	692	698	667	582
17	230	81	114	96	306	392	523	597	702	711	642	586
18	230	82	120	114	311	399	527	593	696	724	644	586
19	228	81	88	118	315	401	530	483	679	726	644	580
20	230	82	88	120	317	406	534	464	682	734	640	582
21	228	83	88	122	318	406	540	589	650	736	652	580
22	230	86	88	123	324	410	544	591	644	738	665	560
23	230	88	88	125	327	419	546	559	644	736	660	465
24	230	70	88	125	331	424	550	584	648	734	650	452
25	233	93	91	126	334	433	553	589	646	755	650	454
26	230	68	93	129	338	433	559	586	652	732	652	445
27	228	78	107	131	338	338	561	561	654	732	654	434
28	230	97	113	133	342	444	565	578	650	730	654	420
29	228	98	78	135	347	303	428	576	650	730	652	373
30	230	100	29	140	......	374	512	570	650	732	646	338
31	230	......	32	142	......	474	......	572	......	728	652	......

NOTE.—Rating curves applicable as follows: One, Oct. 1 to Nov. 13, Feb. 1–10, and June 15 to Sept. 21; one, Nov. 15–21, Feb. 11–12, and Feb. 19 to June 14; one, Nov. 22 to Dec. 29; and one, Sept. 23–30. Indirect method for shifting control, Dec. 30 to Jan. 31, and Sept. 22. Discharge interpolated Feb. 13–18, June 29, and July 11, 17, and 21. Discharge estimated Nov. 14, Dec. 15, Apr. 12, and Sept. 22.

Monthly discharge of Jordan River near Lehi, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	284	228	233	14,300
November	230	68	117	6,960
December	120	28	90.2	5,550
January	142	35	90.6	5,570
February	347	144	262	15,100
March	474	303	389	23,900
April	716	392	515	30,600
May	597	464	565	34,700
June	702	534	612	36,400
July	755	648	704	43,300
August	726	640	673	41,400
September	652	338	563	33,500
The year	755	28	402	291,000

SUMMIT CREEK NEAR SANTAQUIN, UTAH.

LOCATION.—In sec. 12, T. 10 S., R. 1 E., at power plant of Utah Power & Light Co., about a mile from Santaquin, Utah County.

DRAINAGE AREA.—27.5 square miles.

RECORDS AVAILABLE.—March 8, 1910, to September 30, 1916.

Gage.—Hook gage at a 4-foot, rectangular, sharp-crested weir with complete end contractions, in the power-plant tailrace, and a vertical staff above a similar 5-foot weir in the main creek; there is also a vertical staff fastened to a cottonwood tree on left bank of creek about 250 yards above the power house. Gage reader, William Broadbent.

Discharge measurements.—Made by wading.

Channel and control.—Bed of rocks and coarse gravel; may shift slightly. Banks high and clean. Controls for both gages formed by weirs. One channel at all stages at upper gage in creek.

Extremes of discharge.—Maximum discharge reported during year, 97 second-feet, April 28; minimum discharge reported, 1.9 second-feet, January 28.

1910–1916: Maximum discharge reported, 150 second-feet, May 10, 1910; minimum discharge reported, 1.9 second-feet, January 28, 1916.

Ice.—Stage-discharge relation not seriously affected by ice.

Diversions.—Above all irrigation diversions.

Regulation.—Flow may be affected at times by operation of power plant.

Accuracy.—No definite information.

Cooperation.—Record of daily discharge furnished by Utah Power & Light Co.

This record gives the total flow of the creek obtained by combining the flow in the tailrace and the flow in the main creek.

No discharge measurements made during the year.

Daily discharge, in second-feet, of Summit Creek near Santaquin, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8.2	7.5	7.4	6.3	6.0	6.4	13	61	64	19	11	9.1
2	8.2	7.5	6.9	6.3	5.9	6.0	14	52	54	19	12	9.5
3	8.5	7.5	6.9	6.4	5.9	6.2	13	54	51	18	11	9.1
4	8.2	7.5	7.5	6.2	5.9	6.3	14	62	59	17	11	9.1
5	8.2	7.2	6.6	6.3	5.9	6.6	14	66	59	17	11	8.8
6	8.2	7.2	7.1	6.4	5.9	6.6	14	71	61	17	11	8.6
7	8.2	8.8	6.9	5.7	5.7	6.6	13	71	66	16	11	8.6
8	8.2	7.8	6.9	6.8	5.0	6.6	13	83	59	16	11	9.6
9	8.2	8.0	6.9	5.7	5.0	6.9	14	81	62	16	11	9.8
10	8.2	7.8	6.4	5.6	5.7	6.9	16	71	54	15	10	9.6
11	8.5	7.2	6.6	5.7	5.4	6.9	25	71	54	15	10	9.5
12	8.6	7.8	6.4	5.6	6.0	6.9	21	66	52	14	10	9.0
13	8.2	7.7	6.6	6.0	6.0	6.9	19	61	51	14	10	8.8
14	8.0	5.0	6.6	6.9	6.0	6.9	20	54	51	14	10	9.0
15	8.3	7.8	6.4	6.6	6.0	6.9	22	59	48	13	10	9.0
16	7.8	7.2	5.6	6.6	6.0	6.9	23	57	44	13	10	8.6
17	7.7	7.1	6.6	6.8	6.0	6.9	28	60	45	13	10	8.6
18	7.7	7.7	6.0	2.4	6.0	8.5	31	42	44	13	10	8.3
19	7.8	7.5	5.6	5.6	6.0	11	24	59	33	12	10	8.6
20	7.7	7.5	6.6	6.6	6.0	14	20	59	31	12	10	8.5
21	7.7	7.5	6.8	6.6	6.3	25	21	45	27	12	10	8.8
22	7.7	7.5	6.6	6.8	6.3	22	22	46	24	11	10	8.5
23	7.7	7.5	6.8	6.8	6.0	21	26	45	22	11	10	8.5
24	7.7	6.9	6.2	6.6	6.3	16	32	45	22	11	9.6	8.6
25	7.7	6.2	6.6	6.6	6.4	16	46	45	21	11	9.5	8.6
26	7.7	7.9	6.6	5.9	6.4	15	45	46	21	12	9.6	8.8
27	7.7	7.8	6.2	6.6	6.4	15	65	50	20	12	9.3	8.8
28	7.7	3.8	6.3	1.9	6.3	16	97	50	20	12	9.1	8.6
29	7.7	7.2	5.7	2.4	6.4	15	64	56	20	11	9.0	8.5
30	7.7	7.4	6.2	3.8	....	14	57	60	20	11	9.1	8.5
31	7.7	....	6.3	3.6	....	13	....	60	....	11	9.1	....

Monthly discharge of Summit Creek near Santaquin, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	8.6	7.7	7.98	491
November	8.8	3.8	7.30	434
December	7.5	5.6	6.54	402
January	6.9	1.9	5.75	354
February	6.4	5.0	5.97	343
March	25	6.0	10.8	664
April	97	13	28.2	1,680
May	83	42	58.3	3,580
June	64	20	41.6	2,480
July	19	11	13.8	848
August	12	9.0	10.1	621
September	9.8	8.3	8.86	527
The year	97	1.9	17.1	12,400

PETEETNEET CREEK NEAR PAYSON, UTAH.

Location.—In SE. ¼ SW. ¼ sec. 29, T. 9 S., R. 2 E., about half a mile above power canal intake and 3 miles above Payson, Utah County.

Drainage area.—28 square miles.

Records available.—August 1, 1910, to September 30, 1916; miscellaneous measurements, 1909–10.

Gage.—Inclined staff on left bank.

Discharge measurements.—Made from footbridge at gage or by wading.

Channel and control.—Bed composed of rocks and gravel; may shift during extremely high water. Banks high and not subject to overflow.

Extremes of discharge.—Maximum discharge reported during year, 165 second-feet April 27; minimum discharge reported, 4.3 second-feet December 31.

1910–1916: Maximum stage reported, 4.02 feet May 10, 1914 (discharge, 200 second-feet); minimum stage, 1.44 feet December 28, 1912 (discharge, 1.7 second-feet).

Ice.—Stage-discharge relation possibly affected by ice for a few days in January. Open-water rating curves used.

Diversions.—None above the station.

Regulation.—City of Payson has constructed several small reservoirs above the station which regulate the flow to some extent.

Cooperation.—Since January 1, 1911, records have been furnished by the United States Reclamation Service.

Discharge measurements of Peteetneet Creek near Payson, Utah, during year the ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 26	R. M. Adams	2.14	5.4	July 6	E. L. McGrath	2.38	10.2
Apr. 21	....do	2.78	45.8	28	Adams and Saxton	2.40	10.8
May 30	E. L. McGrath	2.69	29.0	Sept. 4	Adams and Jones	2.33	9.0
30	R. M. Adams	2.67	26.7	27	Jones and Saxton	2.34	7.7

Daily discharge, in second-feet, of Peteetneet Creek near Payson, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8.7	6.3	6.8	5.5	8.0	9.5	13.2	110.0	37.3	11.3	10.4	8.8
2	8.0	6.3	7.4	6.7	8.0	9.8	13.2	126.0	33.6	11.7	11.0	8.8
3	7.4	6.5	7.0	6.8	8.0	10.1	13.2	141.0	29.5	12.0	11.7	8.8
4	7.4	6.8	6.6	6.9	8.2	10.4	13.4	150.0	25.4	12.4	12.0	8.8
5	7.4	7.1	6.6	7.9	8.5	10.4	13.7	159.0	23.8	11.7	12.4	8.6
6	6.8	7.4	6.6	7.2	8.6	10.4	13.7	144.0	22.1	11.0	12.0	8.4
7	6.3	7.4	6.8	7.1	8.8	10.1	13.7	128.0	20.8	10.7	11.7	8.6
8	6.3	7.4	7.1	7.0	9.3	9.8	15.2	114.0	19.4	10.4	11.4	8.8
9	6.3	7.1	7.1	8.4	9.8	10.0	16.6	99.0	18.8	10.4	11.0	8.6
10	6.3	6.8	7.1	9.7	9.7	10.1	17.7	86.0	18.3	10.4	10.7	8.4
11	6.3	6.5	7.0	12.1	9.5	9.8	18.8	72.0	18.3	10.4	10.4	8.4
12	6.5	6.3	6.8	12.4	9.8	9.5	20.4	82.0	18.3	10.4	10.4	8.4
13	6.8	6.3	6.8	11.2	10.1	9.8	22.1	91.0	17.4	10.1	10.4	9.1
14	6.8	6.3	6.8	10.0	10.4	10.1	22.9	70.0	16.6	9.8	10.1	9.3
15	6.8	6.5	6.5	8.7	10.7	10.1	23.7	49.0	15.8	9.8	9.8	9.5
16	6.6	6.8	6.3	7.5	10.1	10.1	27.2	56.0	15.0	9.8	9.6	9.5
17	6.3	6.5	6.3	7.7	9.5	10.1	30.6	64.0	15.0	9.4	9.3	9.5
18	6.3	6.3	6.3	7.9	9.8	10.1	32.6	80.0	15.0	9.1	9.3	9.3
19	6.3	6.5	6.5	7.9	10.1	10.2	34.5	96.0	14.6	9.1	9.3	9.1
20	6.4	6.8	6.8	7.9	10.1	10.4	39.4	92.0	14.1	9.1	9.1	9.4
21	6.6	6.8	7.0	8.2	10.1	10.6	44.2	88.0	13.4	9.3	8.8	9.8
22	6.5	6.8	7.1	8.4	10.2	10.7	56.8	69.0	12.8	9.5	8.8	9.8
23	6.3	7.1	6.8	8.2	10.4	10.4	69.5	50.0	12.8	9.5	8.8	9.8
24	6.3	7.4	6.6	8.1	10.0	9.8	102.0	56.0	12.8	9.5	8.6	9.6
25	6.3	7.1	6.1	7.9	9.8	10.2	134.0	63.0	12.4	9.3	8.4	9.4
26	6.5	6.8	5.6	7.8	9.8	10.7	150.0	67.0	12.1	9.1	8.4	9.3
27	6.8	6.8	5.3	8.0	9.8	11.4	165.0	71.0	11.6	8.8	8.4	8.8
28	6.8	6.8	5.0	8.2	9.5	12.1	115.0	67.0	11.0	8.6	8.6	8.8
29	6.8	6.8	4.8	8.0	9.3	11.4	65.6	63.0	11.0	9.0	8.8	8.8
30	6.5	6.8	4.5	7.8	......	10.7	80.4	52.0	11.0	9.5	9.1	8.8
31	6.3	......	4.3	7.9	......	11.9	......	41.0	......	10.0	9.3	......

Monthly discharge of Peteetneet Creek near Payson, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	8.7	6.3	6.70	412
November	7.4	6.3	6.77	403
December	7.4	4.3	6.40	394
January	12.4	5.5	8.22	505
February	10.7	8.0	9.51	547
March	12.1	9.5	10.3	633
April	165	13.2	46.6	2,770
May	159	41	87.0	5,350
June	37.3	11.0	17.7	1,050
July	12.4	8.6	10.0	615
August	12.4	8.4	9.94	611
September	9.8	8.4	9.03	537
The year	165	4.3	19.1	13,800

NOTE.—Monthly discharge computed by United States Geological Survey.

SPANISH FORK AT THISTLE, UTAH.

LOCATION.—In SW. ¼ SW. ¼ sec. 28, T. 9 S., R. 4 E., in Thistle, Utah County, about 800 feet below point at which Soldier Fork and Thistle Creek unite to form Spanish Fork, and 3 miles above Diamond Fork.

DRAINAGE AREA.—490 square miles.

RECORDS AVAILABLE.—December 3, 1907, to September 30, 1916.

GAGE.—Inclined staff on right bank 10 feet below cable. Used May 4, 1915, to September 30, 1916; read daily by Mrs. Effie Gordon. November 21, 1912, to May 3, 1915, a vertical staff on right bank at same site and datum. December 3, 1907, to November 20, 1912, a vertical staff on left bank about a mile downstream.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Bed composed of gravel and sand. One channel at all stages. Left bank low and subject to overflow; right bank high and partly wooded. Channel straight for 100 feet above and 600 feet below gage. Gravel bar about 30 feet below gage, shifting.

Extremes of discharge.—Maximum stage reported during year, 6.15 feet May 9 (discharge, 822 second-feet); minimum stage, 3.90 feet November 12 (discharge, 34.0 second-feet).

1907–1916: Maximum discharge reported, 920 second-feet May 10, 1914; minimum discharge, 18.5 second-feet December 20, 1913.

Ice.—Stage-discharge relation affected by ice for short periods.

Diversions.—No important diversions above the station.

Regulation.—None.

Cooperation.—Records since January 1, 1911, furnished by United States Reclamation Service.

Discharge measurements of Spanish Fork at Thistle, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 19	R. M. Adams	4.02	47.2	Aug. 11	Jones and Saxton	4.22	55
May 5	....do	5.75	587	23	Adams and Saxton	4.16	51
June 10	McGrath and Saxton	4.94	215	30	Adams and Jones	4.12	43.1
23	Adams and Saxton	4.68	140	Sept. 12	.....do	4.16	50
July 27	.....do	4.42	86				

Daily discharge, in second-feet, of Spanish Fork at Thistle, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept
1	42.1	42.1	38.9	....	535	297	94.3	61.4	43.0
2	38.9	45.3	52.1	....	535	318	86.7	61.4	44.0
3	40.5	46.9	54.1	....	562	284	86.7	61.4	44.0
4	42.1	43.7	59.8	....	590	276	86.7	61.4	43.0
5	43.7	43.7	54.1	....	590	276	84.8	69.1	44.0
6	43.7	43.7	54.1	....	686	269	81.0	69.1	43.0
7	42.1	57.9	54.1	....	709	242	81.0	58.8	42.0
8	42.1	50.2	54.1	....	732	235	81.0	58.8	41.0
9	40.5	52.1	54.1	....	822	225	86.7	54.9	45.0
10	37.2	46.9	54.1	....	720	215	77.6	53.6	45.0
11	35.6	45.3	54.1	208	690	225	74.2	51.0	46.0
12	37.2	34.0	45.3	225	657	215	74.2	49.0	46.0
13	43.7	46.9	59.8	208	674	205	74.2	58.8	47.0
14	45.3	42.1	56.0	202	635	192	94.3	54.9	48.0
15	50.2	37.2	56.0	228	590	183	75.9	52.3	48.0
16	46.9	54.1	50.2	249	456	173	81.0	53.6	47.0
17	46.9	42.1	42.1	259	431	164	81.0	52.3	46.0
18	46.9	54.1	38.9	276	416	153	74.2	51.0	46.0
19	46.9	63.7	43.7	249	431	144	64.0	51.0	46.0
20	43.7	59.8	46.9	215	406	147	64.0	50.0	46.0
21	40.5	56.0	46.9	205	396	144	62.7	49.0	46.0
22	46.9	54.1	50.2	208	416	144	53.6	48.0	46.0
23	43.7	54.1	52.1	259	397	132	60.1	48.0	46.0
24	43.7	59.8	....	446	397	124	61.4	47.0	45.0
25	43.7	45.3	....	456	361	121	69.1	45.0	45.0
26	48.6	56.0	....	466	339	117	75.9	41.0	45.0
27	48.6	42.1	....	535	328	110	90.5	41.0	47.0
28	48.6	38.9	....	618	318	108	72.5	41.0	48.0
29	48.6	54.1	....	618	318	102	72.5	42.0	49.0
30	48.6	50.2	....	618	322	102	64.0	43.0	49.0
31	45.3	....	....	....	322	....	62.7	43.0	....

Note.—No record Dec. 24 to Apr. 10.

Monthly discharge at Spanish Fork at Thistle, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	50.2	35.6	44.0	2,710
November	63.7	34.0	48.8	2,900
December 1-23	59.8	38.9	50.9	2,320
April 11-30	618	202	337	13,400
May	822	318	509	31,300
June	318	102	188	11,200
July	94.3	53.6	75.8	4,660
August	60.1	41.0	52.3	3,220
September	49.0	41.0	45.5	2,710

NOTE.—Monthly discharge computed by U. S. Geological Survey.

SPANISH FORK NEAR SPANISH FORK, UTAH.

LOCATION.—In SW. ¼ sec. 2, T. 9. S., R. 3 E., about half a mile below United States Reclamation Service diversion dam of Strawberry Valley project, half a mile above intake of East Bench canal, 5 miles southeast of Spanish Fork, Utah County.

DRAINAGE AREA.—670 square miles.

RECORDS AVAILABLE.—May 23, 1900, to November 30, 1901; March 26, 1903, to September 30, 1916.

GAGE.—Inclined staff on right bank January 1, 1913, to September 30, 1916; original gage inclined staff on right bank about 600 feet above East Bench canal heading, May 23, 1900, to November 30, 1901, and March 26, 1903, to July 31, 1912; temporary gage one-fourth mile above original gage, August 1 to December 31, 1912.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and rocks; one channel at all stages; straight for about 200 feet above and 150 feet below gage. Banks high amd may cave off during floods. Water is turbulent and control generally shifts during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.08 feet March 21 (discharge, 879 second-feet); minimum stage, river dry December 19, 20, and February 6.

1900–1916: Maximum stage recorded, 6.0 feet May 21, 1907, (discharge, 1,970 second feet); minimum stage, river dry at several different times when entire flow was being diverted at Reclamation Service dam.

ICE.—Stage-discharge relation affected by ice at times.

DIVERSIONS.—Above all important diversions except the United States Reclamation Service power canal which supplies the high line canal, the power plant, and the Salem canal; water can also be returned to the river at the power plant. In 1916 this canal diverted 85,000 acre-feet.

The Strawberry reservoir (present capacity about 250,000 acre-feet) has been constructed to store the waters of Strawberry River, a stream in the Colorado River Basin; this water can be diverted to the Spanish Fork basin by means of a tunnel.

REGULATION.—Natural flow affected by diversion by the United States Reclamation Service half a mile above the station and will also be affected whenever water is supplied from the Strawberry reservoir.

COOPERATION.—Since January 1, 1911, records have been furnished by the United States Reclamation Service.

Discharge measurements of Spanish Fork near Spanish Fork, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 22	R. M. Adams	6.86	507	July 5	E. L. McGrath	4.89	130
22	.....do	6.65	466	27	Adams and Saxton	4.93	137
Apr. 11	.....do	7.50	514	Aug. 9	Jones and Saxton	4.20	44
May 8	.....do	8.70	787	15	.....do	4.45	71
9	.....do	8.67	848	22	.....do	4.43	66
17	.....do	6.48	372	31	.....do	4.50	77
June 8	E. L. McGrath	5.32	187	Sept. 6	.....do	4.47	77
20	.....do	5.05	163	18	.....do	4.40	66
July 3	.....do	4.88	130	25	.....do	4.42	67
4	.....do	4.74	110				

Daily discharge, in second-feet, of Spanish Fork near Spanish Fork, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	14.5	8.8	8.8	......	......	44.1	266	552	237	147	106.0	75.5
2	9.8	8.8	8.8	......	......	46.7	381	522	226	147	102.0	75.5
3	9.8	8.8	11.3	......	......	45.4	297	496	209	151	83.5	75.5
4	12.1	8.8	16.0	23.2	25.0	51.7	140	496	212	119	80.7	71.6
5	12.9	9.3	14.5	23.2	25.9	94.0	381	634	209	138	87.0	70.3
6	12.1	10.6	14.5	23.2	0	88.0	354	681	204	138	94.0	76.8
7	12.1	23.2	11.3	......	19.6	82.0	321	756	201	137	83.5	75.5
8	12.1	17.6	10.6	......	24.1	83.5	216	756	193	139	41.6	79.4
9	11.3	16.0	12.9	35.3	27.7	105.8	354	788	198	151	46.7	82.0
10	9.3	17.6	14.5	26.8	28.6	148.2	270	638	201	154	42.9	80.7
11	6.9	12.1	12.9	......	36.5	164	514	654	206	160	36.5	80.7
12	7.9	6.4	6.9	27.7	41.6	166	510	618	193	164	46.7	80.7
13	9.8	12.9	14.5	37.8	36.5	188	467	522	189	164	82.0	79.4
14	10.6	14.5	14.5	19.6	36.5	196	474	482	182	166	78.1	66.2
15	13.7	8.8	16.0	25.0	39.1	198	447	425	174	174	74.2	69.0
16	14.5	14.5	7.9	25.0	37.8	229	507	376	178	179	76.8	66.2
17	14.5	11.3	5.3	25.0	37.8	258	537	359	173	171	76.8	64.8
18	14.5	12.1	2.7	......	46.6	254	556	340	181	138	80.7	64.8
19	13.7	14.5	0	......	46.7	333	505	195	175	137	79.4	66.2
20	13.7	16.0	0	29.5	44.1	314	442	342	165	141	74.2	71.6
21	12.9	16.8	2.9	......	44.1	879	392	345	166	140	71.6	71.6
22	12.1	16.0	7.6	......	46.7	552	404	330	164	125	71.6	72.9
23	10.6	15.2	11.3	25.0	46.7	562	458	319	152	123	75.5	70.3
24	9.3	17.6	11.3	26.8	46.7	303	542	308	147	128	75.5	70.3
25	9.3	8.8	11.3	26.8	46.6	320	626	337	147	132	72.9	67.6
26	11.3	16.0	11.3	31.3	47.5	381	556	280	134	135	72.9	67.6
27	12.1	16.0	11.3	......	51.7	324	687	268	138	140	74.2	66.2
28	12.1	12.4	11.3	......	63.4	408	789	253	142	140	74.2	69.0
29	11.3	8.8	11.3	......	54.2	366	846	227	131	137	78.1	54.2
30	10.6	14.5	11.3	......	......	351	687	227	131	122	76.8	52.5
31	10.6	......	11.3	......	......	320	......	232	......	104	76.8	......

NOTE.—Stage-discharge relation affected by ice at times from Jan. 1 to Feb. 3; mean discharge for periods not estimated.

Monthly discharge of Spanish Fork near Spanish Fork, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	14.5	6.9	11.5	707
November	23.2	6.4	13.2	786
December	16.0	0	10.8	664
February 4-29	63.4	0	38.9	2,010
March	879	44.1	253	15,600
April	846	140	464	27,600
May	788	195	444	27,300
June	237	131	179	10,700
July	179	104	143	8,790
August	106	41.6	74.0	4,550
September	82.0	52.5	71.2	4,240

NOTE.—Monthly discharge computed by United States Geological Survey.

SPANISH FORK AT LAKE SHORE, UTAH.

LOCATION.—In NE. ¼ sec. 15, T. 8 S., R. 2 E., about a mile east of Lake Shore, Utah County, 3 miles above mouth and about 3 miles northwest of Spanish Fork; below all tributaries and diversions.

DRAINAGE AREA.—700 square miles.

RECORDS AVAILABLE.—December 10, 1903, to July 10, 1907; March 10, 1909, to September 30, 1916.

GAGE.—Inclined staff with vertical low-water extension, on right bank about half a mile below highway bridge March 10, 1909, to September 30, 1916; original gage vertical staff on left bank immediately below bridge December 10, 1903, to May 25, 1904; gage at the old cable 800 feet above the bridge May 26, 1904, to July 10, 1907.

DISCHARGE MEASUREMENTS.—Made from cable at present gage or by wading.

CHANNEL AND CONTROL.—Bed soft; fairly permanent. One channel at all stages; banks of earth, high and clean.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.85 feet April 29 (discharge, 792 second-feet); minimum stage, river dry August 7–16, and August 21 to September 8.

1903–1916: Maximum stage recorded, 16.0 feet May 11, 1909 (discharge, 1,430 second-feet); minimum stage occurred in 1916, see preceding paragraph.

ICE.—Stage-discharge relation slightly affected by ice for short periods.

DIVERSIONS.—Entire flow is diverted above station during last part of irrigation season; only waste and return waters pass the gage at that time.

REGULATION.—Natural flow affected by the diversions above station.

COOPERATION.—Since January 1, 1911, records have been furnished by the United States Reclamation Service.

Discharge measurements of Spanish Fork at Lake Shore, Utah, during the year ending Sept. 30, 1916.

[Made by R. M. Adams.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 25	4.08	93	Apr. 27	12.32	737
Mar. 29	7.82	355	May 22	4.78	135

Daily discharge, in second-feet, of Spanish Fork at Lake Shore, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.6	6.0	76.0	59.8	79.0	144	317	480	4.5	2.0	1.0	0.0
2	2.6	6.0	79.0	61.4	77.0	119	369	425	21.0	2.0	1.0	0.0
3	2.6	6.0	82.0	63.0	78.0	95	393	472	17.5	2.0	1.0	0.0
4	2.6	6.0	79.4	57.6	80.0	122	438	417	4.5	2.0	1.0	0.0
5	2.6	6.0	76.4	52.5	88.0	144	435	464	2.0	2.0	0.7	0.0
6	2.6	11.6	74.0	47.5	96.0	167	393	502	2.0	2.0	0.3	0.0
7	2.6	17.3	75.0	45.5	104	167	365	528	2.0	2.0	0.0	0.0
8	2.6	23.0	76.0	59.0	107	122	381	569	2.0	1.7	0.0	0.0
9	2.6	23.0	73.5	72.5	110	179	421	546	2.0	1.3	0.0	0.3
10	2.6	23.0	71.0	86.0	112	236	476	582	2.0	1.0	0.0	0.7
11	2.6	28.0	76.5	80.0	113	251	645	524	2.0	1.0	0.0	1.0
12	2.6	33.0	82.0	74.0	113	251	591	451	2.0	1.0	0.0	1.0
13	2.6	42.0	80.0	75.5	113	293	560	389	2.0	1.5	0.0	1.0
14	2.6	51.0	78.0	77.0	113	274	555	317	2.0	2.0	0.0	1.0
15	2.6	60.0	76.0	71.8	113	254	609	277	2.0	1.7	0.0	1.0
16	2.6	60.0	75.0	66.7	113	243	645	229	2.0	1.3	0.0	1.3
17	2.6	60.0	74.0	61.5	116	277	698	174	2.0	1.0	2.3	1.7
18	2.6	62.5	74.7	67.7	119	337	703	122	2.0	1.0	4.5	2.0
19	2.6	65.0	75.2	74.0	119	349	663	119	2.0	1.0	3.0	2.0
20	2.6	65.0	76.0	64.4	119	472	564	151	2.0	1.0	1.5	2.0
21	2.6	65.0	79.0	55.2	119	627	537	232	2.0	1.0	0.0	2.0
22	2.6	65.0	82.0	63.5	120	672	519	128	2.0	1.0	0.0	2.0
23	2.5	65.0	73.5	71.7	122	560	573	122	2.0	1.0	0.0	2.0
24	2.4	65.0	65.0	80.0	123	528	645	116	2.0	1.0	0.0	2.0
25	2.3	65.0	60.0	86.0	125	381	707	101	2.0	1.0	0.0	2.0
26	2.5	65.0	55.0	92.0	123	381	725	89	2.0	1.0	0.0	2.0
27	2.6	65.0	50.0	86.0	121	385	757	86	2.0	2.1	0.0	2.0
28	2.6	65.0	52.5	80.0	119	409	779	33.5	2.0	3.3	0.0	2.0
29	2.6	65.0	55.0	80.0	131	393	792	27.0	2.0	2.5	0.0	2.0
30	3.7	70.5	56.6	80.0	....	345	627	21.0	2.0	1.7	0.0	2.0
31	4.1	....	58.2	80.0	....	321	....	17.5	....	1.0	0.0	....

NOTE.—Discharge for Dec. 30 and 31 interpolated by United States Geological Survey.

Monthly discharge of Spanish Fork at Lake Shore, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	4.1	2.3	2.66	164
November	70.5	6.0	43.7	2,600
December	82.0	50.0	71.5	4,400
January	92.0	45.5	70.1	4,310
February	131	77.0	110	6,330
March	672	95.0	306	18,800
April	792	317	563	33,500
May	582	17.5	281	17,300
June	21.0	2.0	3.32	198
July	3.3	1.0	1.52	93.5
August	4.5	0	.526	32.3
September	2.0	0	1.17	69.6
The year	792	0	121	87,800

NOTE.—Monthly discharge computed by United States Geological Survey.

DIAMOND FORK NEAR THISTLE, UTAH.

LOCATION.—In NE. ¼ SE. ¼ sec. 17, T. 9 S., R. 4 E., at foot bridge about 200 yards above mouth, 2½ miles from Thistle, Utah County.

DRAINAGE AREA.—157 square miles.

RECORDS AVAILABLE.—December 2, 1907, to September 30, 1916.

GAGE.—Inclined staff on left bank about 5 feet above footbridge.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of small gravel; shifts. One channel at all stages; straight for 100 feet above and below gage. Banks covered with cottonwood trees; subject to overflow during extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.08 feet May 7 (discharge, 457 second-feet); minimum stage, 2.74 feet January 21 (discharge, 4.2 second-feet).

1907–1916: Maximum discharge, 735 second-feet May 9, 1909 (stage, 5.5 feet). Minimum discharge occurred in 1916, see preceding paragraph.

ICE.—Stage-discharge relation slightly affected by ice for short periods.

DIVERSIONS.—No diversions of importance.

REGULATION.—Natural flow affected by water supplied from the Strawberry reservoir.

COOPERATION.—Since January 1, 1911, all records have been furnished by the United States Reclamation Service.

Discharge measurements of Diamond Fork near Thistle, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 31	R. M. Adams	2.90	9	July 23	R. M. Adams	4.68	188
May 5	.....do	4.90	368	Aug. 11	Jones and Saxton	4.32	121
23	.....do	4.45	186	14	Adams and Saxton	4.45	158
26	.....do	4.32	156	23	.....do	4.58	166
June 10	McGrath and Saxton	4.76	232	30	Adams and Jones	4.60	170
23	Adams and Saxton	4.72	234	Sept. 12	.....do	4.65	170
July 4	.....do	4.30	137				

Daily discharge, in second-feet, of Diamond Fork near Thistle, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	26.3	24.2	26.3	7.5	9.0	17.7	90	255	142	270	167	173
2	26.3	24.2	25.6	7.5	7.2	17.7	104	244	128	272	160	173
3	26.3	24.2	26.3	11.4	10.5	17.7	146	252	128	136	157	116
4	26.3	24.2	24.9	9.0	11.7	16.8	128	319	146	132	142	114
4	27.0	24.2	26.3	9.6	10.8	26.0	103	400	137	274	138	114
6	27.0	24.9	25.6	9.9	11.7	18.4	88	427	139	268	440	114
7	27.0	34.0	25.6	6.6	14.1	18.8	94	457	130	266	154	113
8	26.3	26.3	24.2	8.7	15.3	20.0	130	447	128	309	162	172
9	26.3	28.4	24.9	11.7	16.2	25.5	140	432	205	303	156	172
10	26.3	27.0	25.6	11.7	16.2	27.0	236	374	225	314	158	171
11	26.3	26.3	24.2	7.2	16.2	32.6	192	323	224	344	155	171
12	26.3	28.4	24.9	6.9	15.6	42.0	164	302	220	345	153	173
13	27.0	27.0	24.2	9.6	16.2	42.0	156	290	220	346	156	171
14	26.3	27.7	29.8	9.9	16.2	30.5	183	259	220	347	157	146
15	27.0	27.7	29.8	9.3	16.5	30.5	226	230	218	348	147	146
16	27.0	27.0	29.8	10.5	17.1	40.4	244	208	233	349	152	146
17	27.0	26.3	22.8	10.5	15.6	48.4	282	192	233	269	156	143
18	26.3	27.0	16.5	5.7	16.5	44.4	219	205	233	253	159	143
19	26.3	26.3	13.0	6.0	16.5	108.0	177	208	233	243	162	143
20	27.0	27.0	12.4	6.0	16.5	61.0	174	199	250	227	156	168
21	26.3	27.0	18.6	4.2	16.8	183.0	133	186	250	217	156	180
22	26.3	27.0	20.7	6.0	17.1	159.0	151	183	248	216	157	180
23	26.3	26.3	23.5	5.7	17.4	192.0	186	192	241	215	170	180
24	25.6	27.0	18.6	6.0	16.8	70.0	244	202	239	213	173	173
25	25.6	27.0	18.6	12.0	16.8	77.0	290	164	246	212	173	168
26	25.6	27.0	20.0	12.0	17.7	74.0	379	149	242	211	173	168
27	25.6	25.6	13.0	12.0	18.8	95.0	381	149	270	188	173	180
28	25.6	18.6	16.5	9.0	17.7	90.0	379	149	261	186	173	180
29	24.9	30.5	13.0	9.0	16.8	70.1	374	146	256	182	173	180
30	24.9	26.3	10.0	9.0	....	64.9	302	142	270	161	173	163
31	24.9	....	7.6	9.0	....	63.6	....	142	....	158	173	....

Monthly discharge of Diamond Fork near Thistle, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	27.0	24.9	26.2	1,610
November	34.0	18.6	26.5	1,580
December	29.8	7.6	21.4	1,320
January	12.0	4.2	8.68	534
February	18.8	7.2	15.2	874
March	192	16.8	59.1	3,630
April	381	88	203	12,100
May	457	142	252	15,500
June	270	128	210	12,500
July	349	132	251	15,400
August	440	138	169	10,400
September	180	113	158	9,400
The year	457	4.2	117	84,800

NOTE.—Monthly discharge computed by United States Geological Survey.

UNITED STATES RECLAMATION SERVICE POWER CANAL NEAR SPANISH FORK, UTAH.

LOCATION.—In the SW. ¼ sec. 2, T. 9 S., R. 3 E., near mouth of canyon, half a mile below canal headgates, about 5 miles southeast of Spanish Fork, Utah County.

RECORDS AVAILABLE.—January 1, 1909, to September 30, 1916.

GAGE.—Inclined staff on right bank graduated to tenths from zero to 5 feet.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading at gage.

CHANNEL AND CONTROL.—Concrete-lined section; bottom width 4.0 feet, side slopes 1 to 1, and maximum depth of water will be about 6 feet. Control not permanent owing to earth and rock slides below the gage.

EXTREMES OF DISCHARGE.—Maximum stage reported during year, 4.84 feet, June 11 (discharge 260 second-feet); minimum stage, canal dry for a few days in March and April.

1909–1916: Maximum stage occurred in 1916; see preceding paragraph. Canal dry at times for cleaning and repairs.

ICE.—State-discharge relation sometimes affected by ice.

DIVERSIONS.—None above station.

REGULATION.—Flow controlled by headgates half a mile above gage.

COÖPERATION.—Since January 1, 1911, all records have been furnished by the United States Reclamation Service.

This canal, which is designed for a capacity of 500 second-feet, diverts on the left side of Spanish Fork in the SE. ¼ sec. 2, T. 9 S., R. 3 E. About 3 miles below the head is the fore bay of the power plant. Here part of the water can be carried on in the High Line canal to irrigate lands at the south end of the project and the remainder used to supply the power plant or turned down the wasteway. The tailrace water and that going down the wasteway is used to supply the Salem canal or returned to the river.

Discharge measurements of United States Reclamation Service power canal near Spanish Fork, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 18	R. M. Adams	2.36	55	July 10	E. L. McGrath	4.85	240
Feb. 1	do	2.39	55	17	do	4.90	234
Apr. 21	do	2.73	96	26	Adams and Saxton	4.00	156
29	do	3.45	148	Aug. 9	Jones and Saxton	3.85	156
May 9	do	4.38	217	15	do	3.70	149
24	do	4.75	243	22	R. M. Adams	3.64	146
June 8	E. L. McGrath	4.50	224	31	Jones and Saxton	3.70	150
19	Adams and Saxton	4.60	237	Sept. 6	R. M. Adams	3.68	148
July 3	E. L. McGrath	4.00	228	18	do	3.58	142
4	do	3.55	126	25	do	3.70	153
5	do	4.55	221				

Daily discharge, in second-feet, of United States Reclamation Service power canal near Spanish Fork, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	67.7	70.2	70.2	60.0	60.2	84.5	75.0	187.5	228	225	137	150
2	70.2	70.2	70.8	66.0	60.5	85.2	0.0	151.0	214	225	143	150
3	70.2	70.2	72.1	64.2	62.8	83.0	84.5	196.0	224	227	136	149
4	70.8	70.2	74.6	64.0	66.0	86.6	0.0	194.8	217	123	184	148
5	71.4	69.0	73.9	65.0	68.0	85.0	0.0	186.5	217	218	132	148
6	70.8	69.6	73.3	65.1	77.5	86.3	0.0	190.0	214	217	143	146
7	70.8	73.9	72.1	58.3	81.0	85.0	0.0	202.5	214	219	126	146
8	70.8	72.7	71.4	54.0	58.0	85.1	102.0	201.0	224	239	129	148
9	70.2	71.4	73.9	72.0	88.5	88.2	0.0	217.0	257	243	160	149
10	69.6	73.9	74.6	65.1	89.0	79.5	143.0	212.0	258	240	155	148
11	67.7	70.2	73.9	59.2	80.0	74.0	0.0	205.0	260	233	153	150
12	67.7	66.5	68.3	59.6	74.8	79.4	0.0	222.0	255	231	156	150
13	69.6	70.2	74.6	63.2	71.8	80.5	0.0	222.0	253	138	158	151
14	70.2	63.0	75.3	64.0	75.5	72.2	0.0	216.0	248	220	148	143
15	71.4	64.2	75.3	65.1	75.9	44.0	89.0	213.0	244	231	147	143
16	72.7	72.7	70.2	65.0	76.0	0.0	89.8	221.0	244	226	148	142
17	72.7	71.4	65.9	65.7	61.8	0.0	93.8	220.0	242	235	146	142
18	72.1	71.4	56.4	63.2	53.0	66.0	94.5	234.0	235	158	148	142
19	72.1	73.3	40.0	61.8	65.1	0.0	95.0	227.0	233	158	144	147
20	71.4	75.3	64.2	60.0	86.6	74.5	92.4	226.1	233	137	146	151
21	72.1	75.3	63.0	53.5	88.0	0.0	95.0	204.0	229	144	147	152
22	72.1	74.6	67.7	54.3	89.5	0.0	91.0	229.0	227	137	146	153
23	71.4	74.6	73.9	61.0	90.0	78.3	97.5	247.0	221	140	150	152
24	70.8	76.6	71.4	65.8	89.5	52.0	102.0	243.0	220	147	148	150
25	70.2	70.8	69.0	67.0	90.0	77.0	103.0	243.0	220	154	150	153
26	72.1	74.6	69.0	72.2	89.8	0.0	137.0	214.0	216	157	149	152
27	71.4	75.3	48.1	63.2	100.8	86.2	153.0	208.0	221	157	150	158
28	71.4	62.5	59.7	64.2	83.2	0.0	150.0	207.0	220	157	148	154
29	72.1	70.8	54.8	57.8	83.6	0.0	157.0	233.0	223	159	152	150
30	72.1	74.6	56.4	62.7	......	0.0	184.0	243.0	221	157	150	148
31	72.1	......	56.9	59.3	......	0.0	......	243.0	......	142	150	......

Monthly discharge of United States Reclamation Service power canal near Spanish Fork, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	72.7	67.7	70.9	4,360
November	76.6	62.5	71.3	4,240
December	75.3	40.0	67.1	4,130
January	72.2	53.5	62.6	3,850
February	100.8	53.0	77.1	4,430
March	88.2	0	52.5	3,230
April	184	0	74.3	4,420
May	247	151	215	13,200
June	260	214	231	13,700
July	243	123	187	11,500
August	184	126	148	9,100
September	158	142	149	8,870
The year	260	0	117	85,000

NOTE.—Monthly discharge computed by United States Geological Survey.

HOBBLE CREEK NEAR SPRINGVILLE, UTAH.

LOCATION.—In sec. 7, T. 8 S., R. 4 E., about 150 feet below Springville power plant, 1 mile above mouth of canyon, and 4 miles southeast of Springville, Utah County.

DRAINAGE AREA.—120 square miles.

RECORDS AVAILABLE.—March 23, 1904, to December 31, 1916, when station was discontinued.

GAGE.—Vertical staff fastened to large tree on right bank, 75 feet below cable, June 1, 1909, to September 30, 1916; original gage vertical staff about 1,000 feet downstream, installed March 23, 1904, washed out by flood April 2, 1907; temporary gage, vertical staff at same site as original gage, installed June 1, 1907, washed out by flood about May 1, 1909.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed composed of boulders and coarse gravel; fairly permanent. One channel at all stages; banks high and wooded.

Extremes of discharge.—Maximum stage recorded during year, 6.40 feet April 29 (discharge, 824 second-feet); minimum stage, 3.15 feet February 1 (discharge, 17.4 second feet).

1909–1916: Maximum stage April 29, 1916. Minimum discharge, 7 second-feet October 7 and 8, and December 10, 1905.

Ice.—Flow largely from springs. Stage-discharge relation not seriously affected by ice.

Diversions.—The only diversion above the station is the power canal and this water is returned to the stream about 150 feet above gage.

Regulation.—Low-water flow may be somewhat affected by operation of power plant.

Cooperation.—Since January 1, 1911, all records have been furnished by the United States Reclamation Service.

Discharge measurements of Hobble Creek near Springville, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 3	R. M. Adams	5.30	227	Aug. 21	Jones and Saxton	3.45	25.7
June 26	McGrath and Saxton	3.98	62	Sept. 11	do	3.50	32
July 25	Adams and Saxton	3.60	36.3	Sept. 29	Adams and Saxton	3.35	22.7

Daily discharge, in second-feet, of Hobble Creek near Springville, Utah, for the period Oct. 1, 1915 to Dec. 31, 1916.

Date.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915-16.												
1	25.0	22.8	27.1	22.3	17.4	21.5	254	524	179	71.0	39.5	21.9
2	23.6	22.5	26.4	21.0	18.2	21.5	299	507	179	65.0	39.5	21.5
3	23.6	22.3	25.7	19.8	19.0	21.5	344	494	179	58.9	39.5	21.1
4	23.6	22.3	25.0	20.2	19.8	22.9	389	524	164	50.5	39.5	20.7
5	23.6	22.3	25.0	20.6	20.6	24.3	374	554	179	50.5	39.5	21.1
6	23.6	23.9	25.0	20.3	20.4	25.8	344	569	224	50.5	37.2	21.5
7	23.6	25.5	26.0	20.0	19.8	25.8	299	524	224	53.9	34.8	21.5
8	23.6	27.1	27.1	19.8	20.4	25.8	314	494	224	67.4	34.8	21.5
9	23.6	26.0	26.4	20.2	20.6	34.2	437	554	209	58.9	34.8	21.5
10	23.6	25.0	25.7	20.6	20.6	39.5	560	524	209	50.5	30.2	25.8
11	23.6	26.0	25.0	19.8	20.6	59.0	674	494	209	47.8	25.7	30.0
12	23.6	27.1	25.0	19.0	20.6	90.5	554	464	209	45.0	25.7	27.8
13	23.6	26.4	25.0	19.8	20.6	122	524	404	209	47.8	25.7	25.7
14	23.6	25.7	26.0	20.6	20.6	122	494	374	209	50.5	25.7	24.7
15	23.6	25.0	27.1	20.1	20.6	122	554	359	209	50.5	25.7	23.6
16	23.6	26.0	27.1	19.5	20.6	136	629	194	194	47.8	25.7	22.5
17	23.6	27.1	27.1	19.0	20.6	194	704	136	194	45.0	27.1	21.5
18	23.6	27.1	27.1	19.1	21.0	239	704	254	186	47.8	28.5	21.5
19	22.9	27.1	27.1	19.3	21.5	299	524	254	179	50.5	30.0	21.5
20	22.3	27.1	27.1	19.5	21.5	374	464	254	164	45.0	27.8	22.9
21	22.3	27.1	26.0	19.6	21.5	674	404	246	136	39.5	25.7	24.3
22	22.3	27.1	25.0	19.8	23.6	494	434	239	136	39.5	25.7	25.7
23	22.7	26.0	26.0	20.4	25.8	584	554	224	122	39.5	25.7	24.0
24	23.2	25.0	27.1	20.6	24.4	464	674	224	98	39.5	27.1	22.3
25	23.6	25.7	26.4	20.5	23.0	194	749	209	86	39.5	28.5	20.6
26	24.3	26.4	25.7	20.2	21.5	232	674	209	98	39.5	30.0	20.6
27	25.0	27.1	25.0	19.8	23.6	269	808	179	98	39.5	27.8	20.6
28	24.3	27.1	24.5	19.8	25.8	314	808	179	86	45.0	25.7	20.6
29	23.6	27.1	24.1	19.8	23.6	269	824	179	77	45.0	25.7	20.6
30	23.3	27.1	23.6	19.0	......	224	554	179	77	43.2	25.7	22.3
31	23.1	......	23.6	18.2	......	239	......	179	......	41.4	23.3	......

Daily discharge, in second-feet, of Hobble Creek near Springville, Utah, for the period Oct. 1, 1915, to Dec. 31, 1916—Continued.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1916				1916				1916			
1	24	22	26	11	30	22	24	21	30	26	30
2	26	21	26	12	30	22	26	22	30	26	30
3	28	21	26	13	30	22	24	23	30	26	30
4	30	21	24	14	30	23	23	24	30	26	30
5	28	21	22	15	30	24	22	25	30	26	30
6	26	21	21	16	30	26	24	26	26	26	30
7	27	21	21	17	30	26	26	27	22	26	29
8	29	22	21	18	30	26	28	28	22	26	28
9	30	22	22	19	30	26	30	29	22	26	27
10	30	22	23	20	30	26	30	30	22	26	26
								31	22	......	26

Monthly discharge of Hobble Creek near Springville, Utah, for the period Oct. 1, 1915, to Dec. 31, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915-16				
October	25.0	22.3	23.5	1,450
November	27.1	22.3	25.7	1,530
December	27.1	23.6	25.8	1,590
January	22.3	18.2	19.9	1,220
February	25.8	17.4	21.3	1,230
March	674	21.5	193	11,900
April	824	254	531	31,600
May	569	136	345	21,200
June	224	77.0	165	9,820
July	71.0	39.5	48.6	2,990
August	39.5	23.3	29.9	1,840
September	30.0	20.6	22.7	1,350
The year	824	17.4	121	87,700
1916				
October	30	22	27.9	1,720
November	26	21	23.9	1,420
December	30	21	26.0	1,600

NOTE.—Monthly discharge computed by United States Geological Survey.

PROVO RIVER AT FORKS, UTAH.

LOCATION.—In NW. ¼ sec. 25, T. 5 S., R. 3 E., half a mile above Vivian Park summer resort, which is just above Forks, Utah County, 2,000 feet below mouth of North Fork of Provo River, which enters on the right, and 3,000 feet above South Fork, which enters on the left, 1 mile above Utah Power & Light Co.'s diversion dam, and 12 miles up Provo Canyon from Provo, on highway and railroad from Provo to Heber.

DRAINAGE AREA.—600 square miles.

RECORDS AVAILABLE.—November 17, 1911, to September 30, 1916. Records have been obtained at various points below the mouth of South Fork since 1890.

GAGE.—Vertical staff on right bank October 5, 1915, to September 30, 1916. Read by J. F. Carter. November 17, 1911, to October 4, 1915, records were obtained from an inclined staff about 2,500 feet downstream.

DISCHARGE MEASUREMENTS.—Made from cable from highway bridge, or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and large boulders; fairly permanent. Banks fairly high and not subject to overflow; one channel at all stages. Well-defined riffle about 80 feet below gage.

Extremes of discharge.—Maximum stage recorded during year, 4.40 feet at 8 a. m. March 21 (discharge, 1,820 second-feet); minimum stage, 0.43 foot at 8 a. m. August 22 (discharge, 208 second-feet).

1911–1916: Maximum discharge, 2,110 second-feet June 8, 1912; minimum discharge, 155 second-feet September 1, 1915.

Ice.—Stage-discharge relation slightly affected by ice.

Diversions.—Station is below diversions for irrigation in Heber Valley and above those in the vicinity of Provo.

Regulation.—A number of small lakes at the headwaters have been utilized as storage reservoirs and flow is regulated to slight extent.

Accuracy.—Stage-discharge relation practically permanent; affected by ice January 1 to February 29. Rating curve fairly well defined between 225 and 1,000 second-feet. Gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating table except for ice-affected period, when a slight correction was made. Records fair.

Discharge measurements of Provo River at Forks, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height. Lower gage.	Gage height. Upper gage.	Discharge.
		Feet.	*Feet.*	*Sec. ft.*
Oct. 5	Stoner and Porter	0.80	0.52	233
Jan. 8	Stoner and Monson	.96	.69	241
Mar. 22	L. C. Monson[a]	2.53	2.48	923
23	A. B. Purton	2.80	2.74	1,070
May 5	L. C. Monson	2.60	2.65	1,030
31	C. C. Jacob	2.48	2.41	927
June 20	Monson and Swendsen[a]	2.36	2.33	968
July 11	C. C. Jacob	1.07	.71	309
Aug. 1	T. F. Wentz[b]	1.00	.58	253
16	C. C. Jacob	.98	.57	239
Sept. 13	H. L. Stoner[a]	.98	.70	280

[a] Employee of Utah Power & Light Co.

[b] Water commissioner, Provo River.

Daily discharge, in second-feet, of Provo River at Forks, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	232	219	297	226	226	315	540	915	957	363	259	272
2	226	211	306	242	262	321	601	814	1,020	346	247	253
3	226	229	312	239	276	279	684	789	864	343	250	253
4	226	211	315	268	288	321	636	789	864	312	247	245
5	232	219	331	262	282	589	605	898	1,010	318	282	247
6	232	213	318	253	288	578	555	1,020	1,160	315	297	247
7	245	256	309	253	291	471	514	1,080	1,150	306	270	250
8	245	245	300	240	291	377	525	1,220	1,080	309	270	242
9	240	229	300	300	279	432	547	1,250	1,100	306	253	265
10	237	250	300	300	282	504	616	1,280	1,180	306	247	337
11	237	242	306	253	279	548	717	1,180	1,150	291	245	306
12	245	245	294	216	279	552	856	1,090	1,100	285	245	297
13	245	237	291	282	253	574	709	999	1,030	282	253	279
14	248	245	300	270	264	559	697	881	1,040	285	237	282
15	248	276	318	262	256	525	709	814	1,040	282	234	285
16	245	282	294	273	256	478	784	688	956	282	242	285
17	259	282	276	245	253	624	847	609	974	291	237	285
18	248	300	259	226	240	697	873	555	898	282	226	282
19	250	306	226	253	256	730	856	544	873	270	221	294
20	245	318	259	259	256	931	747	601	864	256	213	288
21	242	328	306	264	256	1,820	709	578	822	259	210	276
22	237	321	300	309	254	1,140	648	578	789	262	208	270
23	240	312	331	264	264	1,030	652	624	672	262	221	291
24	232	306	331	285	264	923	721	632	593	259	226	265
25	242	300	276	279	267	705	797	601	563	262	247	270
26	242	315	279	273	273	668	931	570	525	262	245	262
27	237	315	253	234	297	640	956	525	436	262	229	253
28	242	265	262	213	303	717	1,070	507	401	309	237	256
29	221	279	282	264	297	640	1,140	589	425	288	240	245
30	215	315	262	237	......	605	1,040	676	363	268	245	245
31	211	......	253	248	......	533	......	839	......	259	270	......

Monthly discharge of Provo River at Forks, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	259	211	238	14,600
November	328	211	269	16,000
December	331	226	292	18,000
January	309	213	258	15,900
February	303	226	270	15,500
March	1,820	279	640	39,400
April	1,140	514	743	44,200
May	1,280	507	798	49,100
June	1,180	363	863	51,400
July	363	256	290	17,800
August	297	208	244	15,000
September	337	242	271	16,100
The year	1,820	208	431	313,000

SOUTH FORK OF PROVO RIVER AT FORKS, UTAH.

Location.—In sec. 26, T. 5 S., R. 3 E., at Vivian Park summer resort, just above Forks, Utah County, about a quarter of a mile above confluence of South Fork with Provo River and 12 miles up Provo Canyon on highway and railroad from Provo to Heber.

Drainage area.—30 square miles.

Records available.—November 17, 1911, to September 30, 1916.

Gage.—Vertical staff nailed to cottonwood tree on right bank June 15, 1913, to September 30, 1916; read by J. F. Carter. Datum raised 2 feet on June 12, 1915. Original gage, vertical staff about 150 feet above mouth of stream, used November 17, 1911, to June 14, 1913.

Discharge measurements.—Made from foot log near gage or by wading.

Channel and control.—Bed composed of gravel; shifting. One channel at all stages; banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 0.76 foot at 9.30 a. m. May 12 and 13 (discharge, 50 second-feet); minimum stage, 0.46 foot at 9.30 a. m. May 29 (discharge 24 second-feet).

1911–1916: Maximum discharge, 74 second-feet, June 10, 1912; minimum discharge, 22 second-feet, May 16, 1915.

Ice.—Stage-discharge relation not affected by ice.

Diversions.—Below all diversions.

Regulations.—None.

Accuracy.—Stage-discharge relation fairly permanent. Rating curve poorly defined. Gage read to hundredths once daily. Daily discharge determined by applying daily gage height to rating table. May be subject to error at certain periods due to diurnal fluctuation. Records fair.

Discharge measurements of South Fork of Provo River at Forks, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	Stoner and Porter *a*	0.60	33.3	May 5	L. C. Monson	0.70	55.2
Jan. 8	H. L. Stoner *a*	.58	26.7	June 20	Monson and Swendsen *a*	.68	56.7
Mar. 22	L. C. Monson *a*	.68	47.4	Aug. 1	T. F. Wentz *b*	.50	29.0
23	A. B. Purton	.70	44.5	Sept. 13	H. L. Stoner	.61	37.3

a Utah Power & Light Co. *b* Water commissioner, Provo River.

Daily discharge, in second-feet, of South Fork of Provo River at Forks, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	34	33	36	34	30	28	34	44	28	35	28	35
2	34	33	36	34	30	28	34	44	28	35	29	35
3	36	33	36	34	30	28	34	44	33	34	29	35
4	36	33	34	34	30	31	34	42	28	34	29	35
5	36	33	36	34	30	32	35	42	42	35	30	35
6	36	33	35	33	30	30	34	44	46	35	34	35
7	36	36	36	33	29	30	34	44	44	35	32	35
8	36	36	35	33	28	29	34	44	44	35	32	37
9	36	36	35	34	28	29	35	46	44	35	32	37
10	36	36	34	34	28	29	35	48	44	30	32	38
11	31	34	34	34	28	30	39	48	44	32	32	37
12	32	34	34	34	28	30	39	50	40	32	32	38
13	31	34	34	34	28	30	40	50	40	32	35	38
14	31	33	34	34	28	29	39	48	40	32	35	37
15	31	36	36	34	28	29	38	48	40	35	35	39
16	31	36	34	34	28	29	44	42	40	35	37	39
17	34	36	34	34	28	29	43	42	40	35	35	38
18	34	36	34	34	28	29	43	40	39	35	35	38
19	34	36	34	34	28	30	42	40	39	35	35	38
20	34	36	34	34	28	30	42	39	39	35	35	39
21	34	36	34	34	28	46	42	38	39	34	37	38
22	34	36	34	34	28	42	42	37	39	32	35	39
23	34	36	34	34	28	42	39	37	37	30	36	39
24	33	36	34	32	28	40	39	37	37	32	36	39
25	32	36	34	32	28	40	40	37	37	32	37	39
26	32	36	34	32	28	40	44	37	37	32	37	39
27	33	36	34	32	29	40	44	37	35	29	37	38
28	33	36	34	31	28	37	48	34	35	29	35	42
29	31	36	34	32	28	35	48	24	35	34	35	37
30	32	36	33	32	......	35	46	28	35	30	35	37
31	32	......	34	31	......	34	......	28	......	30	35	......

Monthly discharge of South Fork of Provo River at Forks, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	36	31	33.5	2,060
November	36	33	35.1	2,090
December	36	33	34.5	2,120
January	34	31	33.3	2,050
February	30	28	28.5	1,640
March	46	28	32.9	2,020
April	48	34	39.5	2,350
May	50	24	40.7	2,500
June	46	28	38.3	2,280
July	35	29	33.1	2,040
August	37	28	33.8	2,080
September	42	35	37.5	2,230
The year	50	24	35.1	25,500

SEVIER LAKE BASIN.

MAMMOTH CREEK NEAR HATCH, UTAH.

Location.—In sec. 1, T. 37 S., R. 6 W., about a quarter of a mile above backwater of Hatchtown reservoir, three-quarters of a mile east of east boundary of Sevier National Forest, and 3½ miles southwest of Hatch, Garfield County.

Drainage area.—151 square miles (measured on topographic maps).

Records available.—July 15 to September 20, 1912; May 17, 1913, to August 22, 1914; October 1, 1915, to September 30, 1916; also some miscellaneous measurements in 1911 and spring of 1912.

Gage.—Stevens continuous water-stage recorder on left bank, May 2 to July 3, 1914, and September 23, 1915, to September 30, 1916; original gage, vertical staff on left bank, 1½ miles above present site, in sec. 2, T. 37 S., R. 6 W., July 15 to September 20, 1912, and May 25 to July 11, 1913; Stevens water-stage recorder at site and datum of original gage, July 12, 1913, to April 25, 1914.

Discharge measurements.—Made from cable or by wading.

Channel and control.—One channel at all stages. Control permanent.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 3.72 feet at 3 a. m. May 12 (discharge, 511 second-feet); minimum stage recorded, 0.92 foot on January 28 and 29 (discharge, 17 second-feet).

1912–1914 and 1916: Maximum stage recorded, 3.78 feet at 7 a. m. and 5 p. m. June 1, 1914 (discharge, 535 second-feet); minimum stage recorded, 0.98 foot July 31, 1913 (discharge, 10 second-feet).

Ice.—Stage-discharge relation seriously affected by ice during most of December, January, and February.

Diversions.—Below all diversions.

Regulation.—None.

Accuracy.—Stage-discharge relation permanent. Rating curves well defined between 20 and 300 second-feet, and fairly well defined above. Water-stage recorder operated satisfactorily except during winter period and from November 14 to 30, 1915, and July 24 to August 3, 1916. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for periods of defective gage-height record. (See footnote to table of daily discharge.) Records good except for periods mentioned.

Discharge measurements of Mammoth Creek near Hatch, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 21	J. J. Sanford	1.07	20	May 19	J. J. Sanford	3.42	370
Dec. 11	A. B. Purton	1.28	27.5	June 1	do	3.20	309
Feb. 22	J. J. Sanford	1.12	22.8	15	do	2.92	256
Apr. 3	do	1.48	37	29	do	2.36	124
22	do	1.96	83	Aug. 20	do	1.81	60
May 9	do	3.57	480	Sept. 13	do	1.52	40.7

Daily discharge, in second-feet, of Mammoth Creek near Hatch, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	32	23	35	......	17	22	36	213	335	109	110	48
2	32	24	......	......	19	22	38	206	345	103	105	47
3	34	21	......	......	20	22	39	213	365	103	105	46
4	35	19	......	......	21	22	41	236	378	101	103	46
5	34	20	......	......	24	24	38	282	389	97	111	44
6	34	26	......	......	25	24	38	361	392	95	116	42
7	34	27	......	......	26	23	37	435	382	92	97	42
8	29	28	......	......	25	22	37	458	375	91	96	43
9	30	29	......	......	25	22	38	473	365	89	92	45
10	30	30	......	......	26	24	41	484	351	84	87	47
11	32	25	29	......	......	26	44	492	328	82	83	45
12	32	25	......	......	......	26	44	492	303	80	78	43
13	30	26	......	......	......	28	42	473	282	78	75	41
14	29	......	......	......	......	30	42	454	260	82	71	41
15	25	......	......	......	......	29	44	421	236	82	69	40
16	26	......	......	......	......	29	50	406	218	82	67	40
17	28	......	......	......	......	30	60	382	204	78	66	41
18	28	......	......	......	......	32	65	385	195	74	64	40
19	28	......	......	......	22	35	65	392	186	72	63	40
20	27	......	......	......	22	38	64	345	182	70	62	39
21	22	......	......	......	23	49	66	300	171	71	59	38
22	22	......	......	......	23	46	77	282	163	70	53	38
23	22	......	......	......	......	50	99	303	154	67	52	39
24	20	......	......	......	......	43	123	310	147	70	51	39
25	21	......	......	......	......	38	152	265	136	80	48	38
26	23	......	......	24	......	36	167	236	117	150	44	38
27	24	......	......	24	......	36	195	254	127	150	44	41
28	25	......	......	17	......	36	241	285	122	120	44	34
29	23	......	......	17	......	36	265	303	123	90	57	47
30	21	......	......	18	......	36	238	342	117	140	67	66
31	22	......	......	20	......	35	......	406	......	110	52	......

NOTE.—No gage-height record, discharge estimated by comparison with record of flow of Sevier River at Hatch, Nov. 14–30, 30 second-feet; Mar. 1–3 and July 24 to Aug. 3, as given in table. Stage-discharge relation affected by ice, discharge estimated by comparison with flow of Sevier River at Hatch: Dec. 2–10, 32 second-feet; Dec. 12–15, 29 second-feet; Dec. 16–31, 38 second-feet; Jan. 1–11, 30 second-feet; Jan. 12–16, 60 second-feet; Jan. 17–25, 26 second-feet; Feb. 11–18, 24 second-feet; Feb. 23–29, 23 second-feet.

Monthly discharge of Mammoth Creek near Hatch, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	35	20	27.5	1,690
November	....	....	27.8	1,650
December	....	....	34.7	2,130
January	....	....	31.7	1,950
February	....	....	23.1	1,330
March	50	22	31.3	1,920
April	265	36	84.2	5,010
May	492	206	351	21,600
June	392	117	248	14,800
July	150	67	92.3	5,680
August	116	44	73.9	4,540
September	66	38	42.6	2,530
The year	492	....	89.3	64,800

SEVIER RIVER AT HATCH, UTAH.

LOCATION.—In SE. ¼ sec. 28, T. 36 S., R. 5 W., at county bridge a quarter of a mile east of J. C. Barnhurst's house at Hatch, Garfield County, and 1½ miles below Hatchtown reservoir.

DRAINAGE AREA.—260 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 3 to November 4, 1911; December 10, 1911, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder 50 feet below bridge, August 23, 1914, to September 30, 1916; inspected by J. C. Barnhurst. Gages previously used as follows: June 3 to November 4, 1911, and December 10, 1911, to May 7, 1912, original gage, about an eighth of a mile upstream from present site; May 8, 1912, to May 6, 1914, vertical staff on middle pier of bridge; Stevens water-stage recorder 1½ miles above bridge, May 7 to May 25, 1914, when Hatchtown reservoir dam broke and released 11,600 acre-feet of stored water. This recorder was reinstalled at old site below bridge August 23, 1914.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.47 feet at 7 a. m. May 10 (discharge, 1,040 second-feet); minimum stage, 0.80 foot November 30, December 1 and 2 (discharge, 80 second-feet).

1911–1916: Maximum stage recorded, 5.8 feet June 5, 1912 (discharge, 1,210 second-feet); minimum stage, 1.0 foot March 18 to April 2, 1912 (discharge, 10 second-feet).

ICE.—Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—Above all diversions except Hatch Bench canal and Panguitch Lake ditch, which divert a small quantity of water from Mammoth Creek. Hillsdale ditch diverts about 4 miles downstream and several other canals about 7 miles below for irrigation in Panguitch Valley.

REGULATION.—Entire flow controlled by gates in Hatchtown reservoir dam before May 25, 1914.

ACCURACY.—Stage-discharge relation subject to change during sudden change in stage of stream; affected by ice during winter. Rating curve well defined. Water-stage recorder not in operation, discharge interpolated, during following periods: October 2–6, January 21–24, February 2–3, and April 23–29. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records good.

Discharge measurements of Sevier River at Hatch, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 21	J. J. Sanford	0.84	97	May 19	J. J. Sanford	2.84	785
Dec. 11	A. B. Purton	.79	97	June 1	do	2.34	588
Jan. 26	J. J. Sanford	.74	89	15	do	2.02	476
Feb. 22	do	.72	81	29	do	1.46	291
Apr. 3	do	1.40	280	Aug. 8	do	1.34	235
22	do	2.20	531	20	do	1.13	162
May 9	do	3.32	980	Sept. 13	do	.97	134

Daily discharge, in second-feet, of Sevier River at Hatch, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	105	105	80	138	165	82	212	737	599	243	329	148
2	106	105	80	122	158	80	236	693	619	236	329	142
3	107	105	90	95	148	85	252	701	623	230	414	140
4	108	105	103	88	140	82	268	737	642	218	297	140
5	109	105	107	87	148	94	252	777	662	212	258	138
6	111	109	109	87	119	92	252	854	677	209	317	133
7	113	131	109	115	90	85	249	924	658	206	243	131
8	109	131	109	113	90	83	255	965	646	204	230	150
9	109	126	107	90	90	83	281	990	646	201	221	148
10	105	126	101	87	90	87	320	1,020	634	195	212	140
11	105	126	95	94	92	94	368	1,010	607	189	204	138
12	105	126	94	236	92	95	351	986	572	189	195	133
13	105	126	95	221	94	99	337	952	523	189	195	133
14	105	122	95	230	101	105	327	903	485	204	187	131
15	101	122	94	230	90	105	351	846	459	204	184	131
16	101	117	126	170	87	109	393	805	433	204	178	128
17	101	117	128	87	88	113	444	761	415	195	173	128
18	101	117	124	90	85	128	463	761	397	192	170	128
19	101	113	122	92	85	140	489	789	386	192	168	131
20	105	113	122	87	82	173	478	749	376	198	170	131
21	105	109	122	87	82	284	496	681	362	206	165	128
22	105	109	122	87	83	300	534	634	354	195	160	128
23	105	105	122	87	83	390	611	634	348	195	152	128
24	105	105	124	87	83	287	689	627	334	192	152	126
25	105	97	124	87	83	258	769	588	320	258	152	124
26	105	97	124	87	82	246	809	530	307	492	150	126
27	105	94	124	87	82	240	891	530	297	395	148	126
28	105	87	124	103	82	236	891	561	278	320	148	128
29	105	83	124	209	82	230	850	580	265	307	178	124
30	105	80	124	145	....	227	842	603	255	497	187	117
31	105	....	122	178	....	206	....	599	....	320	158	....

Monthly discharge of Sevier River at Hatch, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	113	101	105	6,456
November	131	80	110	6,550
December	128	80	111	6,820
January	236	87	123	7,560
February	165	82	99.2	5,710
March	390	80	159	9,780
April	891	212	465	27,700
May	1,020	530	759	46,700
June	677	255	473	28,100
July	497	189	242	14,900
August	414	148	207	12,700
September	150	117	132	7,860
The year	1,020	80	249	181,000

SEVIER RIVER BELOW OLD HOUSTON CANAL, NEAR PANGUITCH, UTAH.

Location.—In the SW. ¼ sec. 4, T. 34 S., R. 5 W., just below heading of Old Houston canal and about 3½ miles north of Panguitch, Garfield County.

Drainage area.—Not measured.

Records available.—August 1 to September 30, 1916, when station was discontinued.

Gage.—Vertical staff on left bank; read by Zera Church.

Discharge measurements.—Made by wading near gage.

Channel and control.—One channel at all stages; fairly permanent.

Diversions.—Numerous diversions for irrigation.

Regulation.—Storage in Panguitch Lake affects the flow at this station to some extent.

ACCURACY.—Stage-discharge relation permanent during period of record. Rating curve not completely defined on account of insufficient discharge measurements. Staff gage read daily except September 13–19, when observer was away from station. Daily discharge ascertained by applying daily gage height to rating table; estimated for days on which gage was not read. Records fair.

Discharge measurements of Sevier River below Old Houston canal, near Panguitch, Utah, during the year ending Sept. 30, 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
June 28		102	Aug. 9	4.30	274
July 11		68	18	4.03	187
25		30	Sept. 12	3.64	86

Daily discharge, in second-feet, of Sevier River below Old Houston canal, near Panguitch, Utah, for the year ending Sept. 30, 1916.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1	416	44	11	416	60	21	100	60
2	416	44	12	416	78	22	78	78
3	344	44	13	416	75	23	78	78
4	416	30	14	416	72	24	78	78
5	416	30	15	416	68	25	60	78
						26	60	78
6	416	44	16	380	64	27	44	78
7	494	44	17	308	64	28	44	78
8	416	30	18	176	60	29	44	78
9	380	30	19	148	60	30	44	78
10	416	60	20	100	60	31	44	

NOTE.—Discharge estimated Sept. 13-19.

Monthly discharge of Sevier River below Old Houston canal, near Panguitch, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
August	494	44	258	15,900
September	78	30	60.8	3,620

SEVIER RIVER NEAR CIRCLEVILLE, UTAH.

LOCATION.—Approximately in sec. 29, T. 31 S., R. 4 W., 2½ miles above mouth of Pine Creek and 8 miles southwest of Circleville, Piute County.

DRAINAGE AREA.—950 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 10 to September 19, 1912; April 23, 1914, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder, with outside and inside staff gages, about a mile below old gage, April 23, 1914, to September 30, 1916, inspected by James Meeks; vertical staff on bridge abutment during irrigation season of 1912; flow practically the same at both places.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—One channel at all stages; stream bed is composed of sand and rocks and is fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.0 feet August 6 (discharge estimated 1,600 second-feet); minimum stage, 2.67 feet September 5 (discharge, 88 second-feet).

1912, 1914–16: Maximum stage recorded in 1916; minimum stage, 2.50 feet July 16, 1915 (discharge 65 second-feet).

Ice.—Stage-discharge relation not affected by ice.

Diversions.—Above all diversions for Circle Valley; below several diversions for Hatchtown project and Panguitch Valley.

Regulation.—Flow affected somewhat by operation of Hatchtown reservoir until dam broke May 25, 1914.

Accuracy.—Stage-discharge relation not permanent. Two rating curves used, fairly well defined by frequent measurements—one applicable October 1 to January 29 and the other February 9 to September 30. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph; shifting-control method used January 30 to February 8. Records good.

Discharge measurements of Sevier River near Circleville, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 22	J. J. Sanford	2.94	110	May 31	J. J. Sanford	4.44	476
Dec. 7	A. B. Purton	3.26	162	June 15	.....do	3.92	386
Jan. 25	J. J. Sanford	3.26	169	28	.....do	3.14	172
Feb. 21	.....do	3.30	194	July 11	.....do	2.92	120
Mar. 31	.....do	3.78	295	29	.....do	4.30	452
Apr. 21	.....do	4.80	607	31	.....do	6.50	1,110
May 5	.....do	5.05	651	31	.....do	6.50	1,070
7	.....do	5.54	771	Aug. 9	.....do	3.88	333
10	.....do	5.67	867	Sept. 12	.....do	3.10	165
18	.....do	5.08	677				

Daily discharge, in second-feet, of Sevier River near Circleville, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	128	122	161	153	140	173	319	804	458	149	426	98
2	120	120	159	207	169	171	342	710	466	149	466	92
3	114	120	161	204	182	166	355	647	469	140	818	92
4	111	120	166	200	169	171	404	635	480	135	691	91
5	106	123	174	170	178	210	402	626	507	135	743	88
6	102	134	170	170	182	247	370	650	507	126	1,250	92
7	94	164	168	150	194	203	342	699	504	124	858	120
8	89	188	170	148	218	195	337	801	493	130	360	121
9	89	295	168	159	238	212	350	828	485	124	342	140
10	90	297	170	164	214	238	386	840	477	135	322	143
11	98	288	170	153	203	243	439	837	477	126	302	142
12	99	164	161	120	210	245	471	837	461	128	295	154
13	95	157	161	125	191	250	444	837	426	121	295	169
14	99	141	163	170	181	254	423	801	390	126	290	158
15	120	157	168	209	185	247	428	768	357	162	268	160
16	111	178	151	190	199	238	461	734	352	203	259	167
17	108	168	142	176	195	238	524	699	314	203	245	167
18	122	163	142	182	199	238	557	664	273	181	234	167
19	123	178	146	190	208	240	580	650	259	164	234	167
20	122	172	144	168	208	259	563	708	245	158	223	171
21	122	170	174	159	210	324	566	650	236	156	199	171
22	111	174	188	142	195	452	583	592	212	160	175	175
23	102	170	194	159	189	458	620	535	201	158	142	175
24	101	164	170	170	187	477	658	535	189	175	133	175
25	105	155	161	166	183	363	708	524	185	364	109	169
26	106	163	159	168	183	373	731	477	181	627	102	167
27	110	172	137	163	193	363	742	452	169	710	102	164
28	120	153	128	168	201	339	786	450	164	741	100	162
29	117	151	161	105	181	337	840	461	166	448	99	166
30	116	161	157	144	......	324	852	463	164	404	108	160
31	117	......	176	136	......	304	......	466	......	781	114	......

Monthly discharge of Sevier River near Circleville, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	128	89	109	6,700
November	297	120	169	10,100
December	194	128	162	9,960
January	207	120	164	10,100
February	218	140	193	11,100
March	458	166	276	17,000
April	852	319	519	30,900
May	840	450	657	40,400
June	507	164	342	20,400
July	781	121	247	15,200
August	1,250	99	332	20,400
September	175	88	146	8,690
The year	1,250	88	277	201,000

SEVIER RIVER NEAR KINGSTON, UTAH.

Location.—In NE. ¼ sec. 9, T. 30 S., R. 3 W., just below highway bridge on road from Kingston to Junction, 1¼ miles above mouth of East Fork and 1½ miles northwest of Kingston, Piute County.

Drainage area.—1,110 square miles (measured on topographic maps).

Records available.—June 12, 1914, to September 30, 1916; also several miscellaneous measurements in 1911 published in Water-Supply Paper 310 as "South Fork near Junction, Utah."

Gage.—Stevens continuous water-stage recorder on left bank near bridge, with outside and inside staff gages, August 7, 1914, to September 30, 1916, inspected by W. S. Price; temporary Stevens water-stage recorder 300 feet downstream, June 12 to July 15, 1914.

Discharge measurements.—Made from cable 300 feet below gage or by wading.

Channel and control.—One channel at all stages; stream bed composed of shifting sand and gravel.

Extremes of discharge.—Maximum stage recorded during year, August 6 (discharge estimated 900 second-feet); minimum stage, 2.01 feet at 8 p. m. July 5 (discharge 51 second-feet).

1914–1916: Maximum discharge for period estimated 900 second-feet August 6, 1916; minimum discharge estimated 20 second-feet June 20 to July 1, 1914.

Ice.—Stage-discharge relation seriously affected by ice.

Diversions.—Below all diversions above mouth of East Fork.

Regulation.—Flow affected by diversions for irrigation.

Accuracy.—Stage-discharge relation continually changing, owing to shifting channel and backwater from Piute reservoir. Frequent discharge measurements permit determination of daily discharge with a fair degree of accuracy except for short periods during the winter when the station was affected by ice. A single standard rating curve was used for the entire year. Curves parallel to this were used for various periods, their positions and periods of use being determined from the discharge measurements and field notes. Mean daily gage height determined by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage height to rating tables, by shifting-control method, and by comparison with flow of Sevier River near Junction and East Fork of Sevier River near Kingston, except for periods of ice effect and missing gage-height record, for which it was estimated. (See footnote to table of daily dischage.) Records fair.

Discharge measurements of Sevier River near Kingston, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 23	J. J. Sanford	1.50	88	May 20	J. J. Sanford	6.77	618
28	do	1.70	105	June 3	do	4.87	337
Dec. 5	A. B. Purton	2.58	208	12	do	4.78	330
Jan. 27	J. J. Sanford	2.50	214	26	do	2.08	54
Feb. 21	do	2.84	248	July 10	do	2.11	60
Mar. 30	do	3.92	355	30	do	5.70	432
Apr. 4	do	4.46	390	Aug. 7	do	9.40	847
13	do	4.82	445	10	do	3.84	334
20	do	5.88	530	21	do	2.80	112
May 2	do	6.76	648	Sept. 11	do	2.78	103
11	do	6.90	629				

Daily discharge, in second-feet, of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	68	110	169	175	180	196	320	765	335	60	530	70
2	68	112	167	175	190	193	350	665	335	58	480	68
3	68	114	175	175	200	179	380	568	332	54	590	65
4	68	114	190	190	210	193	414	545	336	51	770	65
5	70	116	206	208	220	239	426	520	366	51	680	60
6	66	142	199	207	220	293	376	530	378	52	900	58
7	65	188	194	187	230	231	350	589	384	60	800	73
8	60	216	188	184	358	198	338	670	366	57	480	85
9	60	208	185	206	366	207	356	690	342	52	417	86
10	65	222	194	208	284	246	394	654	324	57	450	95
11	66	214	192	205	250	263	452	644	336	61	414	101
12	66	190	184	190	246	265	500	645	330	66	384	130
13	65	180	178	190	236	268	446	622	294	63	360	151
14	66	158	181	190	216	278	426	615	276	69	342	137
15	79	167	176	190	210	248	426	615	258	93	294	130
16	101	194	168	205	228	246	459	602	241	135	264	133
17	90	196	153	211	231	249	537	556	202	122	241	142
18	84	192	153	221	230	253	563	511	178	108	208	140
19	91	207	149	243	241	269	570	504	166	106	184	135
20	97	206	137	218	239	307	546	589	149	95	166	135
21	97	207	149	198	242	360	537	561	132	91	124	138
22	97	204	163	190	234	402	555	512	124	91	89	139
23	89	199	171	194	223	400	607	472	114	89	65	141
24	88	200	168	210	216	540	654	441	102	96	64	158
25	87	181	165	216	214	377	676	410	89	161	60	146
26	89	183	161	220	200	364	676	378	68	420	57	140
27	89	190	146	210	223	362	664	350	56	600	60	124
28	105	175	128	224	243	365	666	340	56	600	68	119
29	104	163	151	175	214	362	735	340	57	570	71	109
30	105	173	150	170	......	362	805	335	58	460	77	79
31	105	......	150	170	......	356	......	335	......	510	80	......

NOTE.—Stage-discharge relation affected by ice, Dec. 30 to Jan. 3, Jan. 12–15, Jan. 29 to Feb. 9; gage not operating Apr. 2, 3, and 29, May 23–27, May 29 to June 2, July 26 to Aug. 9, discharge estimated.

Monthly discharge of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	105	60	81.2	4,990
November	222	110	177	10,500
December	206	128	169	10,400
January	243	170	199	12,200
February	366	180	234	13,500
March	540	179	293	18,000
April	805	320	507	30,200
May	765	335	535	32,900
June	384	56	226	13,400
July	600	51	166	10,200
August	900	57	315	19,400
September	158	58	112	6,660
The year	900	51	251	182,000

SEVIER RIVER NEAR JUNCTION, UTAH.

Location.—In SE. ¼ sec. 34, T. 29 S., R. 3 W., at Harris's ranch, about a quarter of a mile below junction of East Fork with Sevier River and 1½ miles east of Junction, Piute County.

Drainage area.—2,390 square miles (measured on topographic maps).

Records available.—June 1 to September 2, 1911; May 1, 1912, to December 31, 1916, when station was discontinued.

Gage.—Friez water-stage recorder on left bank, May 20, 1915, to December 31, 1916; June 1 to September 2, 1911, inclined staff on right bank about 500 feet below present site; May 1, 1912, to May 25, 1914, Friez water-stage recorder at site of original gauge; June 20 to August 2, 1914, vertical staff on left bank about 400 feet below present site; August 3, 1914, to May 19, 1915, Friez water-stage recorder at site of vertical staff except August 26 to October 19, 1914, when the recorder was not in operation and readings were secured from the vertical staff.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Stream bed composed of sand and gravel; shifts during high stages; stage-discharge relation affected by backwater from Piute reservoir when full.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 5.48 feet at 2 p. m. August 6 (discharge, determined from extension of rating curve, 1,600 second-feet); minimum stage recorded, 1.12 feet at 7.30 p. m. August 26 (discharge, 38 second-feet).

1911-1916: Maximum discharge occurred when gage was washed out on May 27, 1914, due to the failure of the Hatchtown dam (mean daily discharge estimated, 5,600 second-feet); minimum stage recorded, −0.25 foot, June 3 to 5, 1913 (discharge, 33 second-feet).

Ice.—Stage-discharge relation somewhat affected by ice.

Diversions.—Numerous diversions above station.

Regulation.—Flow controlled to large extent by operation of gates in dam of Otter Creek reservoir on East Fork; before the dam failed, May 25, 1914, by operation of Hatchtown reservoir also.

Accuracy.—Stage-discharge relation variable, owing to changing control and backwater from reservoir; frequent discharge measurements made during the year determine these changes. Three fairly well defined rating curves used. Operation of water-stage recorder satisfactory throughout the year. Daily discharge ascertained by applying to rating table the mean daily gauge height obtained by inspecting recorder graph; several rating tables and shifting-control method used. Records fair.

Discharge measurements of Sevier River near Junction, Utah, during the years ending Sept. 30, 1916 and 1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 27	J. J. Sanford	1.24	143	June 15	J. J. Sanford	2.42	237
Dec. 5	A. B. Purton	1.68	281	24	do	2.30	213
				26	do	2.62	269
1916.				July 10	do	2.66	342
Jan. 27	J. J. Sanford	1.58	237	28	do	4.56	1,030
Feb. 21	do	1.71	276	Aug. 1	do	3.83	902
Mar. 29	do	2.90	541	10	do	3.04	557
Apr. 4	do	2.93	522	21	do	1.57	115
13	do	3.18	580	Sept. 11	do	1.50	119
20	do	3.60	765	Oct. 9	do	3.25	632
May 2	do	3.98	949	25	do	2.32	304
12	do	4.01	909				
20	do	3.50	654	1917.			
June 3	do	2.90	389	Jan. 12	do	1.78	214
12	do	2.84	388				

Daily discharge, in second-feet, of Sevier River near Junction, Utah, for the period Oct. 1, 1915, to Nov. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.												
1	78	148	241	200	....	244	430	1,060	367	339	982	76
2	75	143	247	200	....	241	450	952	381	339	928	70
3	80	135	235	200	....	223	477	860	374	336	1,050	80
4	84	135	241	210	....	229	524	820	370	330	1,230	83
5	86	135	289	235	268	277	566	792	402	324	1,140	81
6	90	170	280	235	271	316	514	808	412	318	1,350	74
7	94	198	268	223	340	268	489	884	437	324	1,300	76
8	99	210	247	215	405	250	468	976	437	336	912	87
9	105	220	232	220	405	247	475	972	405	339	676	93
10	96	226	226	229	340	268	514	948	378	345	562	107
11	90	232	232	215	310	283	588	944	342	345	496	116
12	90	223	223	215	304	298	636	916	367	357	458	134
13	90	218	218	220	277	298	580	840	357	357	433	152
14	90	195	226	220	277	331	576	756	330	360	426	143
15	103	208	229	220	277	274	588	728	312	384	388	134
16	129	218	212	230	268	256	620	664	294	437	363	129
17	125	208	200	230	274	265	692	612	243	458	345	136
18	117	205	195	230	271	283	764	559	213	420	317	138
19	117	220	185	230	280	310	784	534	258	367	215	134
20	119	226	170	226	286	358	768	632	252	345	182	134
21	123	229	180	205	277	436	744	618	219	339	136	284
22	123	229	190	195	268	562	764	566	202	327	89	349
23	123	229	200	208	256	668	808	510	208	312	62	360
24	117	229	200	232	256	740	868	479	205	318	53	370
25	117	210	200	241	250	570	920	458	267	378	48	366
26	133	208	190	247	247	540	952	430	270	750	43	366
27	143	223	175	244	262	525	972	381	264	970	42	345
28	145	212	175	253	271	536	988	370	297	1,030	50	338
29	148	212	180	210	262	534	1,040	357	327	1,030	60	326
30	148	235	180	195	....	507	1,090	348	342	814	76	290
31	148	....	180	195	....	446	....	342	....	938	85	....

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1916.								
1	329	263	11	576	263	21	311	269
2	380	266	12	472	260	22	310	263
3	458	263	13	447	251	23	310	263
4	506	257	14	440	254	24	309	266
5	360	257	15	412	266	25	308	263
6	489	254	16	374	293	26	305	269
7	1,120	275	17	342	290	27	299	270
8	852	260	18	317	269	28	290	270
9	664	263	19	314	269	29	290	270
10	616	269	20	311	272	30	281	270
						31	272	....

NOTE.—Stage-discharge relation affected by ice and discharge estimated from observer's notes and by comparison with records of discharge at Kingston, as follows: Dec. 20, 1915, to Jan. 4, 1916, Jan. 13–19, and Jan. 31, as in table; Feb. 1–4, 215 second-feet; Dec. 1–8, 260 second-feet; Dec. 9, 250 second-feet; Dec. 10–31, 240 second-feet. Discharge July 26 and Aug. 3, 6, and 7 determined by averaging hourly discharge. Aug. 19–21, one staff-gage reading daily. Discharge interpolated Oct. 22–24 and Nov. 27–30, 1916.

Monthly discharge of Sevier River near Junction, Utah, for the period Oct. 1, 1915, to Dec. 31, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915-16.				
October	148	75	110	6,760
November	235	135	203	12,100
December	289	170	214	13,200
January	253	195	220	13,500
February	405	....	278	16,000
March	740	223	374	23,000
April	1,090	430	688	40,900
May	1,060	342	681	41,900
June	437	202	318	18,900
July	1,030	312	463	28,500
August	1,350	42	468	28,800
September	370	70	186	11,100
The year	1,350	42	351	255,000
1916.				
October	1,120	272	421	25,900
November	293	251	266	15,800
December	....	....	*a* 245	15,100

a Estimated.

PIUTE RESERVOIR NEAR MARYSVALE, UTAH.

LOCATION.—In NW. ¼ sec. 3, T. 29 S., R. 3 W., at Piute dam, 11 miles south of Marysvale, Piute County.

RECORDS AVAILABLE.—March 22, 1914, to September 30, 1916.

GAGE.—Iron pins driven every foot into rock face at outlet gates; readings between foot marks are measured with a graduated scale.

COOPERATION.—Gage readings and storage table furnished by State engineer of Utah.

Daily storage, in acre-feet, of Piute reservoir near Marysvale, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.												
1	9,700	1,700	(*a*)	6,200	17,200	27,100	37,800	34,500	42,200	36,000	23,400	14,900
2	9,400	1,600	(*a*)	6,700	17,600	27,400	37,800	34,700	42,400	35,600	23,100	14,900
3	9,300	1,500	(*a*)	7,100	18,000	27,800	37,900	34,800	42,600	35,400	22,600	14,900
4	8,900	1,400	(*a*)	7,500	18,400	28,100	37,900	34,700	43,100	34,900	22,300	15,100
5	8,500	1,250	(*a*)	7,900	18,700	28,400	38,200	34,600	43,600	34,700	21,900	15,300
6	8,400	1,100	(*a*)	8,200	19,000	28,800	38,400	34,600	44,100	33,700	21,600	15,500
7	8,000	1,050	(*a*)	8,600	19,300	29,000	38,600	34,700	44,400	33,500	21,200	15,600
8	7,700	1,000	(*a*)	9,000	19,700	29,300	38,800	34,700	44,600	33,000	20,900	15,600
9	7,400	950	(*a*)	9,400	20,000	29,600	38,900	34,700	44,800	32,400	20,600	15,700
10	7,100	900	(*a*)	9,800	20,400	29,900	39,000	34,800	44,800	32,000	20,300	15,800
11	6,800	800	(*a*)	10,100	20,800	30,200	39,300	34,900	45,000	31,400	20,000	15,800
12	6,600	700	(*a*)	10,500	21,100	30,500	39,400	35,000	45,100	31,100	19,600	15,800
13	6,200	650	(*a*)	10,900	21,600	30,800	39,100	35,300	44,800	30,600	19,300	15,700
14	5,800	600	(*a*)	11,200	21,900	31,100	39,000	35,800	44,500	30,100	18,900	15,700
15	5,500	450	(*a*)	11,600	22,200	31,600	39,000	36,500	44,200	29,600	18,600	15,700
16	5,300	350	(*a*)	11,900	22,600	32,000	38,900	37,100	43,800	29,200	18,300	15,600
17	5,100	250	0	12,200	22,800	32,500	38,800	38,100	43,200	28,700	18,000	15,400
18	4,700	200	600	12,600	23,300	33,000	38,600	38,500	42,700	28,100	17,700	15,200
19	4,400	0	1,000	12,800	23,700	33,400	38,400	39,100	42,000	27,800	17,500	15,100
20	4,100	(*a*)	1,700	13,200	23,900	33,700	38,000	39,700	41,300	27,400	17,100	15,000
21	3,800	(*a*)	2,000	13,600	24,400	34,100	37,600	40,000	40,500	26,900	16,900	14,900
22	3,500	(*a*)	2,400	13,800	24,800	34,400	37,500	40,100	39,900	26,500	16,800	14,600
23	3,200	(*a*)	3,100	14,200	25,100	34,900	37,400	40,400	39,200	26,000	16,500	14,400
24	3,000	(*a*)	3,400	14,500	25,400	35,200	37,200	40,600	38,700	25,800	16,300	14,200
25	2,800	(*a*)	3,800	14,800	25,800	35,600	36,900	40,900	38,400	25,500	16,100	13,900
26	2,600	(*a*)	4,100	15,100	26,100	36,000	36,300	41,000	38,000	25,200	15,900	13,700
27	2,400	(*a*)	4,100	15,400	26,600	36,300	35,800	41,100	37,600	24,900	15,800	13,500
28	2,300	(*a*)	4,800	15,700	26,800	36,600	35,200	41,200	37,200	24,600	15,600	13,200
29	2,000	(*a*)	5,100	16,000	....	37,000	34,600	41,500	36,600	24,600	15,300	12,800
30	1,900	(*a*)	5,500	16,400	....	37,400	34,400	41,700	36,300	24,300	15,100	12,300
31	1,800	....	6,000	17,000	....	37,700	....	42,000	....	23,900	15,000	....

a Reservoir dry.

Daily storage, in acre-feet, of Piute reservoir near Marysvale, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.												
1	11,400	5,600	13,800	24,600	35,600	46,200	48,900	47,400	38,000	....	28,600	19,400
2	11,400	5,600	14,200	24,900	36,000	46,200	48,800	47,500	38,000	....	29,200	18,600
3	11,000	5,600	14,600	25,200	36,200	46,200	49,400	47,400	38,000	28,400	30,100	17,200
4	10,600	5,600	14,900	25,600	36,500	46,100	50,300	47,000	38,000	28,100	31,300	16,400
5	10,200	5,600	15,400	26,000	36,900	46,200	50,700	47,000	37,800	27,800	32,300	15,700
6	9,900	5,600	15,600	26,500	37,300	46,400	50,500	46,800	37,600	27,400	34,000	14,900
7	9,500	5,600	16,000	26,800	37,700	46,400	50,200	46,400	37,500	27,100	35,200	14,000
8	9,200	5,800	16,400	27,200	38,300	46,300	49,800	46,400	37,200	26,600	35,700	13,200
9	9,900	6,100	....	27,600	38,900	46,300	49,500	46,400	37,100	26,400	35,800	12,600
10	8,600	6,500	17,000	28,000	39,500	46,200	49,100	46,600	36,800	26,000	35,600	11,700
11	8,300	6,800	17,400	28,400	40,000	46,200	49,000	46,600	36,600	25,800	35,300	11,000
12	8,000	7,100	17,600	28,600	40,500	46,200	48,900	46,600	36,500	25,400	35,000	10,200
13	7,700	7,400	18,000	28,900	41,000	46,200	48,800	46,400	36,300	25,100	34,600	9,500
14	7,400	7,500	....	29,100	41,300	46,200	48,500	46,000	36,300	24,900	34,100	8,800
15	7,100	7,900	18,800	29,300	41,700	46,200	48,000	45,600	36,300	24,800	33,700	8,200
16	6,900	8,300	19,200	29,800	42,000	46,300	47,800	45,400	36,000	24,700	33,300	7,300
17	6,700	8,700	19,500	30,200	42,500	46,300	47,600	44,800	35,600	24,600	32,600	6,500
18	6,500	9,100	19,900	30,700	42,800	46,400	47,300	44,400	35,100	24,400	32,000	5,700
19	6,200	9,400	20,200	31,100	43,200	46,400	47,300	43,800	34,700	24,200	31,300	5,100
20	6,100	9,600	20,400	31,600	43,600	46,600	47,400	43,500	34,400	23,900	30,400	4,400
21	6,000	10,000	20,800	31,900	43,900	46,700	47,300	43,000	33,500	23,800	29,600	3,800
22	5,900	10,400	21,100	32,400	44,400	47,200	47,000	42,600	32,800	23,300	28,900	3,300
23	5,800	10,900	21,500	32,600	44,700	47,800	46,900	42,200	32,300	23,000	27,700	3,200
24	5,700	11,200	21,800	33,000	45,100	48,800	46,900	41,600	31,800	22,700	26,600	3,000
25	5,600	11,700	22,200	33,400	45,400	49,100	46,900	41,300	31,300	22,600	25,800	2,700
26	5,600	12,200	22,600	33,800	45,600	49,400	46,800	41,000	30,700	23,900	24,800	2,500
27	5,600	12,500	23,000	34,200	45,800	49,400	46,900	40,500	....	23,800	23,800	2,300
28	5,600	12,800	23,300	34,600	46,100	49,400	46,900	40,000	29,800	25,600	22,800	2,000
29	5,600	13,200	23,700	35,000	46,200	49,300	46,900	39,500	29,600	26,600	22,400	1,900
30	5,600	12,500	24,000	35,200	....	49,200	47,200	39,100	29,400	27,100	21,000	1,800
31	5,600	....	24,300	35,500	....	49,000	....	38,400	....	27,900	20,100	....

SEVIER RIVER BELOW PIUTE DAM, NEAR MARYSVALE, UTAH.

Location.—In sec. 34, T. 28 S., R. 3 W., about 700 yards below dam of Piute reservoir, 11 miles south of Marysvale, Piute County.

Drainage area.—2,440 square miles (measured on topographic maps).

Records available.—May 17 to August 31, 1911; May 1, 1912, to September 30, 1916.

Gage.—Friez water-stage recorder about 500 feet below site of former gage, May 4, 1912, to September 30, 1916; new datum; sloping gage on right bank, May 17 to August 31, 1911.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed composed of sand and loam; one channel at all stages. Control is a riffle of heavy gravel and rocks located at the gage; practically permanent, shifting only slightly during high stages.

Extremes of discharge.—Maximum stage recorded during year, 2.54 feet May 4–5 (discharge, 962 second-feet); minimum discharge recorded December 25–31 (discharge, 29 second-feet).

1911–16: Maximum stage recorded, 3 feet May 27, 1914 (discharge, 1,380 second-feet); minimum stage, −0.52 foot October 25, 1913 (discharge, 2.6 second-feet).

Ice.—Stage-discharge relation not seriously affected by ice.

Diversions.—No water diverted between this station and that near Junction.

Regulation.—Flow past station entirely controlled by operation of gates in dam above.

Accuracy.—Stage-discharge relation permanent. Rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Discharge measurements of Sevier River below Piute dam, near Marysvale, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 28	J. J. Sanford	1.14	191	May 21	J. J. Sanford	2.33	811
Dec. 12	A. B. Purton	.66	85	June 16	.....do	1.77	459
Jan. 29	J. J. Sanford	.14	32.3	17	.....do	1.78	456
Mar. 29	.....do	1.93	529	24	.....do	1.88	547
Apr. 13	.....do	2.08	636	July 29	.....do	2.00	586
20	.....do	2.30	781	Sept. 11	.....do	1.95	559

Daily discharge, in second-feet, of Sevier River below Piute dam, near Marysvale, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	383	194	79	......	238	543	954	573	503	597	603
2	379	194	79	......	238	415	954	435	503	603	591
3	282	194	82	......	241	97	954	374	514	609	585
4	280	194	79	......	238	97	962	411	525	609	579
5	296	194	79	......	238	386	962	486	525	621	573
6	296	194	79	34	238	621	938	520	525	621	561
7	292	194	81	33	272	627	938	508	525	627	573
8	292	164	81	33	309	633	938	503	525	633	591
9	292	137	82	32	313	639	938	503	531	639	579
10	284	137	82	32	313	639	938	498	537	639	567
11	284	137	82	32	313	639	946	470	543	639	561
12	280	137	84	32	313	633	946	445	543	639	573
13	280	119	73	32	313	633	938	392	543	639	561
14	276	100	35	34	317	709	930	330	543	639	555
15	276	99	31	36	317	780	930	388	543	639	579
16	272	99	30	37	317	780	930	455	543	639	597
17	272	99	29	37	317	780	922	465	543	639	579
18	272	99	29	38	322	780	862	503	555	639	567
19	272	100	30	38	322	780	802	503	579	621	591
20	244	100	30	38	322	780	802	520	579	621	609
21	194	100	30	38	322	825	802	525	579	615	585
22	194	76	30	38	322	870	802	520	579	609	567
23	194	38	30	43	326	870	802	514	561	603	555
24	194	38	30	56	352	870	802	514	549	603	537
25	194	38	29	56	392	915	671	508	543	597	525
26	194	38	29	65	435	954	645	508	525	591	519
27	194	51	29	95	498	962	645	508	498	585	503
28	194	68	29	176	543	962	645	503	543	579	498
29	194	79	29	238	543	962	645	503	585	597	492
30	194	79	29	......	543	962	645	503	585	621	486
31	194	......	29	......	543	......	645	......	591	609	......

NOTE.—No gage-height record Jan. 1 to Feb. 5; reservoir gates closed; leakage past gates and flow past station estimated as follows: Jan. 1-31, 29 second-feet; Feb. 1-5, 31 second-feet.

Monthly discharge of Sevier River below Piute dam, near Marysvale, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (in total acre-feet).
	Maximum.	Minimum.	Mean.	
October	383	194	256	15,700
November	194	38	117	6,960
December	84	29	50.9	3,130
January	....	....	29.0	1,780
February	238	....	51.0	2,930
March	543	238	343	21,100
April	962	97	705	42,000
May	962	645	846	52,000
June	573	330	480	28,600
July	591	498	544	33,400
August	639	579	618	38,000
September	609	486	561	33,400
The year	962	....	384	279,000

SEVIER RIVER AT SEVIER, UTAH.

LOCATION.—In E. ½ sec. 32, T. 25 S., R. 4 W., at Sevier, Sevier County, about 100 yards above railroad bridge on Y spur, 50 yards west of main-line track of Denver & Rio Grande Railroad and 45 yards above mouth of Clear Creek.

DRAINAGE AREA.—2,700 square miles.

RECORDS AVAILABLE.—May 20, 1911, to September 30, 1916.

GAGE.—Friez water-stage recorder on right bank, May 16, 1912, to September 30, 1916; original gage, vertical staff nailed to cottonwood tree, May 20, 1911, to January 7, 1912, when carried out by ice; temporary gage, January 8 to February 23, 1912; inclined staff at same site as Friez water-stage recorder, February 24 to May 15, 1911.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Permanent, except at sudden high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.08 feet from 8 a. m. May 9 to noon May 10 (discharge 1,120 second-feet); minimum stage, 1.35 feet 3 p. m. December 16 (discharge, 32 second-feet).

1911–1916: Maximum stage recorded, 4.7 feet at 6 p. m. June 3, 1914 (discharge, 1,570 second-feet); minimum stage, 1.29 feet October 26, 1913 (discharge, 15 second-feet).

ICE.—Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—A few small ditches divert between Piute dam and this station.

REGULATION.—Flow past the station practically controlled by operation of gates in Piute reservoir dam, about 27 miles above.

ACCURACY.—Stage-discharge relation permanent after the spring floods. Two fairly well-defined rating curves used—one prior to May 17 and the other after May 26. Water-stage recorder operated satisfactorily during the year except for a few days in November, March, and April and during the winter. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records good except for December, January, and February, when stage-discharge relation was affected by ice.

Discharge measurements of Sevier River at Sevier, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 1	J. J. Sanford	2.32	208	May 17	J. J. Sanford	3.92	1,010
Dec. 3	A. B. Purton	1.85	101	26	.....do	3.50	726
Jan. 21	J. J. Sanford	1.61	62	June 5	.....do	3.22	580
Mar. 9	.....do	2.56	297	10	.....do	3.50	743
25	.....do	2.70	357	22	.....do	3.37	612
25	.....do	2.70	360	July 8	.....do	3.28	598
Apr. 8	.....do	3.24	621	18	.....do	3.21	588
19	.....do	3.57	820	Aug. 15	.....do	3.38	626
29	.....do	3.92	1,030	Sept. 15	.....do	3.21	567

Daily discharge, in second-feet, of Sevier River at Sevier, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	418	212	103	58	......	230	567	1,028	682	577	626	604
2	382	212	103	59	......	233	567	1,010	594	582	632	599
3	382	212	103	61	......	236	314	1,010	487	577	632	594
4	279	212	103	......	68	240	150	1,010	442	594	638	582
5	313	212	103	......	68	247	135	1,016	545	599	643	572
6	313	212	103	......	......	250	393	1,028	643	599	648	566
7	309	212	103	......	......	247	611	1,052	654	599	648	555
8	309	219	103	......	......	290	622	1,076	643	604	643	566
9	298	205	105	......	......	298	622	1,082	665	621	643	566
10	305	183	105	......	......	298	628	1,082	709	610	643	566
11	309	177	105	......	68	298	633	1,082	704	604	643	555
12	309	167	103	......	65	299	638	1,076	670	599	709	572
13	305	157	103	......	62	300	644	1,058	648	588	665	577
14	302	137	91	......	74	301	650	1,058	560	582	665	572
15	305	131	59	......	72	302	725	1,058	525	577	660	560
16	302	127	54	......	71	303	810	1,058	616	577	654	582
17	302	123	......	59	68	304	810	1,022	621	572	648	588
18	298	123	......	54	65	305	812	1,016	604	560	643	588
19	294	123	......	66	62	305	812	950	632	566	643	577
20	294	123	......	......	65	305	812	908	638	572	638	604
21	233	123	......	......	64	305	818	902	654	577	638	599
22	212	122	......	......	62	305	878	896	638	577	632	582
23	205	86	......	......	61	305	902	890	626	577	626	560
24	205	71	......	58	65	305	902	878	621	577	621	555
25	205	70	......	58	77	343	914	794	610	588	616	545
26	202	66	......	58	86	409	968	726	610	594	604	540
27	202	65	......	58	98	450	992	704	610	566	594	535
28	199	82	......	......	116	495	1,016	698	610	560	588	530
29	199	103	......	......	170	520	1,016	692	594	604	582	525
30	199	103	......	......	......	535	1,028	687	582	610	599	520
31	212	......	......	......	......	556	......	682	......	621	610	......

NOTE.—Gage not in operation, discharge estimated Nov. 1–5, 11, 12, 15, 16, 18, 19, Mar. 12–17, Apr. 7, 9–18. Stage-discharge relation affected by ice; discharge estimated as follows: Dec. 17–31, 57 second-feet; Jan. 4–16, 60 second-feet; 20–23, 62 second-feet; 28–31, 60 second-feet; Feb. 1–3, 65 second-feet; 6–10, 67 second-feet.

Monthly discharge of Sevier River at Sevier, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	418	199	277	17,000
November	219	65	146	8,690
December	105	....	77.5	4,770
January	66	....	59.9	3,680
February	170	....	73.7	4,240
March	556	230	326	20,000
April	1,030	135	713	42,400
May	1,080	682	943	58,000
June	704	442	615	36,600
July	621	560	587	36,100
August	709	582	635	39,000
September	604	520	568	33,800
The year	1,080	....	419	304,000

SEVIER RIVER NEAR RICHFIELD, UTAH.

LOCATION.—In sec. 32, T. 23 S., R. 2 W., about 150 feet below Vermilion canal dam and 2 miles east of Richfield, Sevier County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 22 to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on left bank, with inside and outside staff gages.

Discharge measurements.—Made by wading near gage.

Channel and control.—Sand and gravel; subject to change during high stages.

Diversions.—Many irrigation canals divert from river above station.

Regulation.—Flow controlled by reservoirs upstream.

Accuracy.—Stage-discharge relation not permanent. Rating curves fairly well defined. Water-stage recorder gave satisfactory gage-height record during period of record. Daily discharge ascertained by applying to rating tables the mean daily gage height obtained by inspecting recorder graph. Shifting-control method used for periods of shift. Records good.

Discharge measurements of Sevier River near Richfield, Utah, during the year ending Sept. 30, 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
July 20	1.13	6.4	Aug. 14	2.35	90
Aug. 4	1.30	12.3	Sept. 7	1.25	14.8

Daily discharge, in second-feet, of Sevier River near Richfield, Utah, for the year ending Sept. 30, 1916.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1	......	14	20	11	......	75	24	21	7	27	28
2	......	14	16	12	......	80	25	22	7	27	29
3	......	13	18	13	......	79	24	23	8	27	32
4	......	13	18	14	......	95	24	24	9	26	38
5	......	24	17	15	......	74	25	25	14	26	34
6	......	50	16	16	......	68	25	26	18	26	31
7	......	66	16	17	......	64	26	27	20	26	31
8	......	67	16	18	......	47	26	28	38	26	34
9	......	71	18	19	......	30	27	29	28	25	36
10	......	64	20	20	7	27	26	30	21	24	36
								31	23	24	......

Note.—No gage-height record; discharge interpolated, Sept. 14–18.

Monthly discharge of Sevier River near Richfield, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
July	38	7	16.7	398
August	95	13	42.6	2,620
September	38	16	25.1	1,490
The period				4,510

SEVIER RIVER NEAR VERMILION, UTAH.

Location.—In NE. ¼ sec. 19, T. 22 S., R. 1 W., at highway bridge half a mile below Rockyford dam, 2 miles below Vermilion, Sevier County, and 4 miles above mouth of Lost Creek.

Drainage area.—3,340 square miles (measured on topographic maps).

Records available.—July 15 to September 23, 1912; July 31, 1914, to September 30, 1916.

Gage.—Vertical staff on right bank, July 31, 1914, to September 30, 1916; original gage used in 1912, a quarter of a mile below. Gage reader, Mrs. Will Barron.

Discharge measurements.—Made by wading or from highway bridge.

Channel and control.—Fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 5.40 feet at 8.30 a. m. April 10 (discharge, 560 second-feet); minimum stage recorded, 3.20 feet May 30 to June 3, June 8 to 10, 22 to 28, and July 1 to 23 (discharge, 3 second-feet).

1912, 1914–1916: Maximum stage recorded, 5.50 feet at 5 p. m. November 24, 1915 (discharge, 658 second-feet); minimum stage, 3.10 feet July 9, 10, 28, 31, and August 1, 1915 (discharge, 2 second-feet).

Ice.—Stage-discharge relation not affected by ice.

Diversions.—Entire flow diverted above station during low-water season; discharge record at such times represents seepage and return flow from canals.

Regulation.—Flow past station regulated to a large extent by dams and reservoirs above.

Accuracy.—Stage-discharge relation permanent. Rating curve well defined below 600 second-feet. Staff gage read to hundredths morning and evening each day during the irrigation season and three or four times a week during the rest of the year. Daily discharge ascertained by applying mean daily gage height to rating table; estimated August 29 to September 11, as gage height record was unreliable. Records good for irrigation season except August 29 to September 11.

Discharge measurements of Sevier River near Vermilion, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 26	J. J. Sanford	4.24	129	May 15	J. J. Sanford	5.08	416
Dec. 14	A. B. Purton	4.40	160	25	.....do	4.78	296
Jan. 22	J. J. Sanford	4.30	148	June 9	.....do	3.16	3.4
Mar. 6	.....do	4.86	296	July 7	.....do	3.20	3.5
28	.....do	5.32	520	Aug. 14	.....do	4.18	114
Apr. 10	.....do	5.36	534	Sept. 9	.....do	3.92	60
18	.....do	5.05	388				

Daily discharge, in second-feet, of Sevier River near Vermilion, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	63	108	157	116	110	175	531	332	3	3	116	54
2	63	108	152	168	116	190	532	332	3	3	116	55
3	72	112	162	143	129	220	533	294	3	3	116	56
4	66	116	173	140	143	250	535	294	63	3	116	57
5	60	125	173	138	148	280	415	222	63	3	116	58
6	63	134	168	173	190	309	415	190	22	3	116	59
7	66	148	168	143	184	314	415	190	27	3	127	60
8	69	148	157	125	196	319	415	352	3	3	138	60
9	60	157	162	148	209	324	460	393	3	3	138	60
10	66	157	168	168	203	352	535	415	3	3	190	78
11	63	152	166	146	162	381	510	415	18	3	176	97
12	66	148	162	125	146	389	510	415	18	3	116	116
13	87	152	162	120	131	394	485	415	27	3	116	116
14	87	148	162	129	116	400	438	415	70	3	116	116
15	98	148	148	125	136	406	332	415	78	3	116	78
16	100	157	143	134	157	406	332	393	78	3	116	78
17	114	160	138	138	146	406	352	372	70	3	106	78
18	134	164	125	138	134	406	372	372	63	3	96	78
19	155	168	82	134	120	406	415	372	63	3	63	78
20	157	203	85	138	123	421	415	372	63	3	63	78
21	162	209	104	148	126	436	393	372	4	3	63	78
22	168	200	120	138	129	451	294	294	3	3	78	78
23	168	190	129	134	126	464	294	294	3	3	78	78
24	148	196	134	138	123	477	294	294	3	4	78	78
25	125	152	129	148	120	490	294	294	3	6	78	78
26	125	152	129	157	124	504	294	294	3	6	50	78
27	116	148	129	162	129	517	294	294	3	6	50	78
28	96	143	116	162	145	530	294	294	3	6	50	78
29	104	152	120	125	160	530	294	256	18	6	58	78
30	104	154	85	138	......	530	294	3	8	116	52	162
31	104	......	116	104	......	530	......	3	......	116	53	......

Monthly discharge of Sevier River near Vermilion, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	168	60	101	6,210
November	209	108	154	9,160
December	173	82	139	8,550
January	173	104	140	8,610
February	209	110	144	8,280
March	530	175	394	24,200
April	535	294	400	23,800
May	415	3	312	19,200
June	78	3	26.4	1,570
July	116	3	10.8	664
August	190	50	98.7	6,070
September	162	54	79.1	4,710
The year	535	3	167	121,000

SEVIER RIVER NEAR GUNNISON, UTAH.

Location.—About 60 rods west of southeast corner of sec. 14, T. 19 S., R. 1 W., near bridge on county road from Gunnison to West View precinct, about 3 miles west of Gunnison, Sanpete County. San Pitch River enters from the east about half a mile below the station.

Drainage area.—3,990 square miles (measured on topographic maps).

Records available.—June 29, 1900, to September 30, 1916.

Gage.—Stevens water-stage recorder on right bank 200 feet below bridge May 19, 1914, to September 30, 1916; vertical staff on right bridge abutment June 29, 1900, to May 18, 1914; datum lowered 1 foot in September, 1910.

Discharge measurements.—Made from cable about 450 feet above gage or by wading.

Channel and control.—One channel at all stages; stream bed composed of fine sand and gravel, shifts at high stages.

Extremes of discharge.—Maximum stage recorded during year, 4.88 feet for 20 hours March 26 (discharge, 915 second-feet); minimum stage, 1.83 feet July 13 and 14 (discharge, 69 second-feet).

1900–1916: Maximum stage recorded, 6.34 feet May 28, 1906 (discharge, 2,240 second-feet); stream dry April 30, 1911.

Ice.—Stage-discharge relation not seriously affected by ice.

Diversions.—During the irrigation season the greater part of the flow is diverted above the station.

Regulation.—Flow at gage is affected by the operation of the Piute reservoir gates and numerous irrigation diversions above.

Accuracy.—Stage-discharge relation fairly permanent during the year except for a change in April due to shift in control and effect of backwater from San Pitch River during short periods in January and March. Two well-defined rating curves used. Operation of water-stage recorder satisfactory except for periods indicated in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph; shifting-control method used April 4–24. Records good.

Discharge measurements of Sevier River near Gunnison, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	L. W. Jordan	2.36	118	Apr. 3	E. A. Porter	4.67	808
Nov. 4	J. J. Sanford	2.80	210	7	.....do	3.51	425
22	L. W. Jordan	3.36	357	18	J. J. Sanford	3.56	490
Dec. 15	A. B. Purton	3.18	313	24	E. A. Porter	3.18	393
Jan. 5	.....do	3.20	298	May 12	.....do	3.50	508
Feb. 2	J. J. Sanford	3.22	249	June 3	.....do	1.97	99
16	.....do	3.18	298	Sept. 8	.....do	1.99	96
Mar. 19	E. A. Porter	3.92	557	18	J. J. Sanford	2.13	129

Daily discharge, in second-feet, of Sevier River near Gunnison, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	144	195	319	300	248	319	783	411	186	80	101	104
2	142	195	319	300	252	338	822	385	136	80	142	99
3	110	211	319	300	276	350	860	382	93	77	177	97
4	108	213	321	294	305	386	890	382	105	78	160	99
5	120	242	327	308	305	448	680	376	148	77	282	99
6	122	260	327	313	356	502	515	395	158	71	325	97
7	124	308	321	308	368	506	430	407	152	69	237	93
8	127	302	310	296	408	528	512	411	134	75	224	93
9	131	289	313	305	448	547	530	474	118	92	234	104
10	131	291	305	333	455	547	560	558	112	114	237	116
11	133	292	308	338	414	547	563	528	118	109	302	130
12	135	294	306	324	386	548	566	509	112	99	282	120
13	142	295	294	316	347	548	528	517	82	69	224	110
14	158	297	300	308	324	549	518	495	77	69	229	135
15	156	298	308	300	324	549	486	464	105	82	229	125
16	162	300	302	291	313	550	461	453	112	82	260	120
17	173	291	281	291	305	550	455	450	128	71	288	124
18	181	300	260	296	310	550	467	440	128	75	288	130
19	195	347	269	302	300	534	480	404	122	71	229	138
20	228	368	269	296	302	528	492	453	128	69	199	150
21	242	371	269	291	310	537	496	502	122	71	186	156
22	242	359	269	289	327	537	430	440	107	88	170	152
23	240	347	269	286	316	554	412	453	101	88	154	164
24	238	338	269	291	294	625	404	443	103	86	148	190
25	230	330	269	305	289	732	427	440	93	86	132	214
26	209	323	278	273	278	910	443	411	88	95	112	209
27	209	315	280	268	286	830	420	361	85	82	101	206
28	209	308	280	273	300	745	436	370	80	86	101	199
29	206	300	280	265	313	745	467	346	75	82	99	181
30	197	302	280	242	......	745	450	334	75	77	104	188
31	197	......	280	245	......	745	......	258	......	77	104	......

NOTE.—Water-stage recorder not operating Nov. 11–15, Nov. 25–28, Dec. 19–25, Dec. 27–Jan. 2, Jan. 13–15, June 27–July 1, and Sept. 11–15, for which periods daily discharge was estimated by comparison with other stations on the stream. Stage-discharge relation affected by backwater from San Pitch River Mar. 10–17, discharge estimated.

Monthly discharge of Sevier River near Gunnison, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	242	108	172	10,600
November	371	195	296	17,600
December	327	260	294	18,100
January	338	242	295	18,100
February	455	....	326	18,800
March	910	319	569	35,000
April	890	404	533	31,700
May	558	258	427	26,300
June	158	....	113	6,720
July	114	69	81.5	5,010
August	325	101	195	12,000
September	254	93	138	8,210
The year	910	69	287	208,000

SEVIER RIVER AT CLARK'S BRIDGE, NEAR FAYETTE, UTAH.

Location.—In SW. ¼ sec. 13, T. 18 S., R. 1 W., at Clark's bridge, about 1½ miles northwest of Fayette, Sanpete County.

Drainage area.—4,960 square miles (measured on topographic maps).

Records available.—March 17 to September 30, 1914; May 8, 1915, to September 30, 1916, when station was discontinued.

Gage.—May 8, 1915, to September 30, 1916, Stevens water-stage recorder on right bank immediately below bridge. Previous to May 8, 1915, a vertical staff gage fastened to downstream side of right bridge abutment.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—One channel at all stages; stream bed composed of fine gravel, sand, and clay; shifting.

Extremes of discharge.—Maximum stage recorded during year, 5 feet April 4 (discharge, 1,300 second-feet); minimum stage, 1.11 feet July 3 and 4 (discharge, 80 second-feet).

1914–1916: Maximum stage recorded, 6.7 feet June 8, 1914 (discharge, 2,090 second-feet); minimum stage, 0.70 foot July 19, 1915 (discharge, 77 second-feet).

Ice.—Stage-discharge relation affected by ice for short periods in January and February.

Diversions.—Station is below all diversions above Sevier bridge reservoir.

Regulation.—Flow at station affected by operation of Piute reservoir gates and by numerous diversions for irrigation.

Accuracy.—Stage-discharge relation variable. Thirty-two discharge measurements made during the year accurately determine changes in control. Operation of water-stage recorder satisfactory. Daily discharge determined by shifting-control method throughout the year.

Cooperation.—Gage-height record furnished and many discharge measurements made by lower Sevier River water users.

Discharge measurements of Sevier River at Clark's bridge, near Fayette, Utah, during the period Oct. 1, 1915, to Jan. 16, 1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Oct. 6	L. W. Jordan	1.32	145	June 11	E. A. Porter	1.50	138
Nov. 3	J. J. Sanford	1.86	248	26	do	1.30	121
24	L. W. Jordan	2.46	375	July 3	J. W. Thurston	1.15	84
Dec. 15	A. B. Purton	2.40	348	12	E. A. Porter	1.31	140
				Aug. 2	do	1.52	179
1916.				6	do	2.64	440
Jan. 5	do	2.48	360	8	J. W. Thurston	2.07	258
22	R. H. Beckwell	2.42	341	17	E. A. Porter	2.36	344
Feb. 1	J. J. Sanford	3.61	333	21	do	1.85	217
1	do	3.61	288	27	do	1.41	139
17	do	2.50	378	Sept. 7	do	1.22	113
Mar. 17	E. A. Porter	4.46	1,090	18	J. J. Sanford	1.45	147
Apr. 1	do	4.36	1,030	25	E. A. Porter	1.90	232
7	do	3.30	580	Oct. 25	do	2.90	433
18	J. J. Sanford	3.25	565	Nov. 2	do	2.50	339
23	E. A. Porter	2.86	435	21	do	4.17	825
May 11	do	3.17	547	Dec. 5	do	3.75	694
26	do	2.89	473	16	do	3.49	565
31	do	2.18	285				
June 2	do	1.72	174	1917.			
4	do	1.56	138	Jan. 16	J. J. Sanford	[a]4.50	496

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Sevier River at Clark's bridge, near Fayette, Utah, for the year ending Sept. 30, 1916.

Day.	Nov.	Oct.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	237	158	348	330	325	402	1,030	437	233	98	120	133
2	240	156	348	330	325	417	1,020	422	181	90	177	131
3	251	129	348	330	325	431	1,020	408	135	80	246	120
4	253	117	353	330	325	460	1,300	394	139	80	218	123
5	269	133	358	350	348	521	1,040	394	171	82	345	123
6	283	141	353	340	402	602	792	408	195	82	417	122
7	337	146	348	332	431	602	592	422	187	85	310	113
8	343	146	335	330	475	619	661	422	167	93	257	115
9	322	142	343	335	505	654	716	466	148	105	260	122
10	324	139	335	364	537	727	716	559	142	135	262	134
11	335	146	343	391	490	843	734	559	133	137	340	146
12	327	156	340	353	460	968	734	559	152	142	314	137
13	337	162	330	343	417	1,080	679	559	119	108	264	126
14	340	181	332	340	375	1,125	661	559	103	103	255	152
15	353	181	348	310	375	1,060	609	527	128	108	248	146
16	348	187	345	316	375	1,080	576	512	144	112	271	146
17	335	199	332	316	375	1,060	543	496	160	96	324	146
18	332	212	314	327	361	727	559	481	165	96	317	146
19	361	222	304	322	361	690	592	466	154	93	265	150
20	400	253	327	324	361	654	592	496	160	90	229	152
21	400	266	312	320	375	690	592	559	160	88	214	162
22	397	273	295	320	375	708	527	496	144	105	208	162
23	375	271	300	310	364	727	466	496	137	108	191	167
24	366	271	312	316	350	823	437	496	139	106	189	191
25	366	271	314	340	356	968	452	496	128	118	181	229
26	340	266	320	377	343	1,240	481	466	120	126	162	240
27	340	262	314	377	356	1,150	452	422	111	126	137	237
28	337	255	372	391	372	1,010	466	408	105	115	128	233
29	324	262	343	350	388	1,010	496	408	98	106	129	212
30	327	248	340	350	....	1,030	496	353	92	105	131	212
13	....	242	330	350	....	1,030	....	310	....	105	129	....

NOTE.—Stage-discharge relation affected by ice Dec. 29 to Jan. 4 and Jan. 29 to Feb. 4. Daily discharge estimated for these periods.

Monthly discharge of Sevier River at Clark's bridge, near Fayette, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	273	117	200	12,300
November	400	237	330	19,600
December	372	295	333	20,500
January	391	310	339	20,800
February	537	....	387	22,300
March	1,240	402	810	49,800
April	1,300	437	668	39,700
May	559	310	466	28,700
June	233	92	145	8,630
July	142	80	104	6,400
August	417	120	233	14,300
September	240	113	158	9,400
The year	1,300	80	348	252,000

SEVIER RIVER AT McARTIE'S FORD, NEAR FAYETTE, UTAH.

LOCATION.—In SE. ¼ sec. 21, T. 17 S., R. 1 W., at entrance to canyon, a third of a mile below return of Fayette canal to river and 7 miles below Fayette, Sanpete County.

DRAINAGE AREA.—5,020 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 4 to December 12, 1914; June 18 to November 3, 1915, when station was discontinued.

GAGE.—Stevens continuous water-stage recorder on right bank, 600 feet below ford, June 22 to November 3, 1915; August 4 to December 12, 1914, McConnell water-stage recorder at same site but referred to a datum 0.07 foot lower.

DISCHARGE MEASUREMENTS.—Made by wading at ford.

CHANNEL AND CONTROL.—Bed composed of coarse gravel; one channel at all stages; shifts occasionally.

Extremes of discharge.—1914–15: Maximum stage recorded, from water-stage recorder, 4.06 feet at 1.45 p. m. December 3, 1915 (discharge, 664 second-feet); minimum stage, 2.08 feet at 3 p. m. July 20, 1916 (discharge, 85 second-feet).

Ice.—Conditions not known.

Diversions.—Below all diversions and tributaries above Sevier bridge reservoir.

Regulation.—Flow at gage is controlled by operation of Piute reservoir gates and numerous irrigation diversions above.

Accuracy.—Stage-discharge relation changed several times. Frequent discharge measurements defined the rating curves fairly well for limited ranges. Operation of water-stage recorder satisfactory except October 22 to November 2, 1915, when clock stopped. Daily discharge ascertained by applying to rating tables the mean daily gage height determined by inspecting recorder graph, except for periods of breaks in gage height record. Records good.

Discharge measurements of Sevier River at McArtie's Ford, near Fayette, Utah, during the period Oct. 1, 1914, to Nov. 3, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Oct. 7	R. W. Davenport......	3.78	496	June 25	J. C. Dort..............	2.23	99
28	J. J. Sanford...........	3.64	461	July 9	.....do..................	2.15	92
Dec. 3	.....do.................	4.01	648	Aug. 3	.....do..................	2.16	100
				25	.....do..................	2.14	97
1915.				31	.....do..................	2.17	102
Jan. 26	.....do.................	4.10	298	Sept. 17	.....do..................	2.50	173
May 14	J. C. Dort..............	....	265	Oct. 6	L. W. Jordan..........	2.44	161
June 18	.....do.................	[a] 2.31	110	Nov. 3	J. J. Sanford...........	2.80	265
22	.....do.................	2.25	103				

[a] Gage height of this and following measurements referred to new datum 0.07 foot higher than that of 1914 gage.

Daily discharge, in second-feet, of Sevier River at McArtie's Ford, near Fayette, Utah, for the period Oct. 1, 1914, to Nov. 3, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	419	436	612	......	......	......	94	95	98	175	262
2	391	430	628	......	......	......	96	95	100	173	263
3	402	419	644	......	......	......	97	100	121	166	265
4	444	422	612	......	......	......	95	109	154	147	......
5	472	402	620	......	......	......	94	115	168	153	......
6	489	398	636	......	......	......	92	117	153	163	......
7	510	388	624	......	......	......	92	116	148	168	......
8	538	380	628	......	......	......	92	114	150	168	......
9	534	374	612	......	......	......	93	112	152	170	......
10	530	377	588	......	......	......	92	105	150	168	......
11	538	377	560	......	......	......	90	103	170	170	......
12	522	374	542	......	......	......	89	104	170	175	......
13	510	355	......	......	......	......	88	104	171	178	......
14	496	350	......	......	265	......	89	100	175	191	......
15	492	346	......	......	......	......	89	98	170	191	......
16	492	340	......	......	......	......	89	103	171	193	......
17	492	340	......	......	......	......	89	103	173	204	......
18	506	340	......	......	......	110	90	103	187	208	......
19	503	349	......	......	......	108	90	101	197	216	......
20	496	394	......	......	......	106	86	97	195	236	......
21	475	440	......	......	......	104	86	94	191	245	......
22	468	447	......	......	......	102	89	95	186	247	......
23	472	450	......	......	......	101	92	94	187	248	......
24	475	450	......	......	......	98	97	93	175	250	......
25	464	489	......	......	......	100	106	96	171	251	......
26	464	606	......	298	......	99	114	97	170	253	......
27	464	616	......	......	......	99	105	100	177	254	......
28	461	596	......	......	......	97	105	98	187	256	......
29	440	612	......	......	......	92	98	98	189	257	......
30	440	624	......	......	......	94	94	97	175	259	......
31	440	......	......	......	......	......	94	100	......	260	......

NOTE.—Discharge interpolated Nov. 14, Dec. 2, and Oct. 22 to Nov. 2, 1915, because of broken gage-height record.

Monthly discharge of Sevier River at McArtie's ford, near Fayette, Utah, for the period Oct. 1, 1914, to Nov. 3, 1915.

Month.	Discharge in second-feet.			Run-off total (in acre-feet).
	Maximum.	Minimum.	Mean.	
1914.				
October	538	391	479	29,500
November	624	340	431	25,600
December 1-12	644	542	609	14,500
1915.				
June 18-30	110	92	101	2,600
July	114	86	93.7	5,760
August	117	93	102	6,270
September	197	98	166	9,880
October	260	147	206	12,700

SEVIER BRIDGE RESERVOIR NEAR JUAB, UTAH.

Location.—In NW. ¼ sec. 1, T. 17 S., R. 2 W., at dam of Consolidated Sevier Bridge Reservoir Co., about 13 miles southwest of Juab, Juab County.

Records available.—January 1, 1914, to September 30, 1916.

Gage.—Inclined staff gage about 100 feet upstream from the south end of the dam since April 26, 1914. January 1 to April 25, 1914, elevations of water surface ascertained by measuring depth of water with a rule at a series of bench marks; these readings were checked at intervals with a wye level.

Cooperation.—Gage-height record furnished by Consolidated Sevier Bridge Reservoir Co.

Daily gage height, in feet, at Sevier bridge reservior near Juab, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.												
1	19.30	18.10	28.90	41.80	48.70	55.10	......	......	......	39.35	26.60	16.54
2	19.20	18.05	29.60	42.00	......	......	......	53.15	......	38.93	26.20	16.40
3	18.90	17.90	30.30	42.20	......	......	58.75	......	......	38.50	25.80	16.39
4	18.80	17.85	30.90	42.30	......	......	......	......	......	38.05	25.45	16.40
5	18.77	17.70	31.60	42.50	......	......	......	......	47.50	37.77	25.06	16.55
6	18.60	17.60	32.25	42.20	49.65	56.10	......	......	......	37.20	24.75	16.65
7	18.68	17.45	32.85	......	......	......	......	......	......	36.75	24.40	16.66
8	18.75	17.30	33.50	......	......	......	......	50.90	......	36.40	24.05	16.66
9	18.75	17.15	34.05	......	......	......	......	......	......	36.00	23.70	16.56
10	18.85	16.99	34.60	......	......	......	58.98	......	......	35.55	23.35	16.08
11	18.95	16.98	35.10	43.35	50.90	57.10	......	......	......	35.10	23.00	16.00
12	18.97	16.48	35.60	......	......	......	......	......	47.65	34.70	22.60	15.90
13	18.93	15.54	36.10	......	......	......	......	......	......	34.30	22.16	15.80
14	18.93	15.45	36.50	......	......	......	......	......	......	33.80	21.80	15.90
15	18.90	16.20	36.85	......	......	......	......	48.80	......	33.36	21.40	16.17
16	18.85	17.10	37.15	44.68	52.00	58.55	......	......	......	32.95	21.05	16.37
17	18.85	18.00	37.55	......	......	......	58.35	......	......	32.52	20.70	16.50
18	18.90	18.85	37.95	......	......	......	......	......	......	32.10	20.40	16.70
19	18.85	19.70	38.40	......	......	......	......	......	45.61	31.70	20.02	16.95
20	18.85	20.56	38.85	......	......	......	......	......	......	31.25	19.68	17.26
21	18.80	21.30	39.05	45.34	53.20	60.56	......	......	......	30.85	19.25	17.40
22	18.80	22.10	39.35	......	......	......	......	47.20	......	30.55	18.80	17.40
23	18.78	22.90	39.60	......	......	......	......	......	......	30.05	18.55	17.50
24	18.65	23.60	39.90	......	......	......	56.60	......	......	29.60	17.90	17.30
25	18.60	24.41	40.15	......	......	......	......	......	......	29.30	17.75	17.20
26	18.55	25.20	40.40	46.92	54.40	59.90	......	......	41.80	28.95	17.55	17.00
27	18.50	26.00	40.70	......	......	......	......	......	......	28.60	17.35	16.65
28	18.45	26.69	41.00	......	......	......	......	......	......	28.25	17.15	16.25
29	18.40	27.41	41.20	......	......	......	......	47.05	......	27.90	16.97	15.65
30	18.30	28.20	41.40	......	......	......	......	......	......	27.40	16.76	15.00
31	18.20	......	41.60	48.20	......	58.75	......	......	......	27.00	16.64	......

Daily gage height, in feet, at Sevier bridge reservior near Juab, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.												
1				33.20	42.45	50.30				41.30		
2												26.10
3	12.72											
4									51.10			
5			24.20								31.30	
6				35.00	43.70	51.80						
7		14.38						55.80				
8										39.20		
9							60.90					24.40
10	12.30											
11				36.82	45.50	53.80						
12			27.40								30.60	
13												
14		15.25						54.30				
15										36.70		
16				38.20	46.90	56.60	60.70					21.40
17	13.53											
18									45.40			
19			29.75								29.60	
20												
21		17.50		39.60	48.10	58.60		52.50				
22										33.40		
23												17.50
24	14.15											
25												
26			32.10	40.80	49.30	60.30					27.70	
27												
28		21.50						52.50				
29					50.00					31.70		
30							58.70					12.20
31	14.25			42.30		61.00						

SEVIER RIVER NEAR JUAB, UTAH.

Location.—In NE. ¼ sec. 2, T. 17 S., R. 2 W., 1,600 feet downstream from Sevier Bridge dam and 14 miles southwest of Juab, Juab County.

Drainage area.—5,120 square miles (measured on topographic maps).

Records available.—September 23, 1911, to September 30, 1916.

Gage.—Stevens continuous water-stage recorder on left bank, 500 feet below old gage, since April 16, 1914; inclined staff on right bank 1,000 feet below Sevier Bridge dam, September 23, 1911, to April 15, 1914.

Discharge measurements.—Made by wading or from cable 600 feet above gage.

Channel and control.—One channel at all stages. Bed composed of sand, clay, and fine gravel. Artificial control of rocks about 40 feet below gage; permanent except during very high stages.

Extremes of discharge.—Maximum stage recorded during year, 5.50 feet at 8 p. m. May 2 (discharge, 1,095 second-feet); minimum stage, 1.26 feet, January 19, 20, 23–27, 30, and 31 (discharge, 7 second-feet).

1911–1916: Maximum stage recorded, 7.8 feet, May 28–29, June 4–12, 1914 (discharge, 2,030 second-feet); minimum discharge recorded, 0.5 second-foot, October 14, 1911.

Ice.—Stage-discharge relation not affected by ice.

Diversions.—None between this station and that near Gunnison.

Regulation.—Flow controlled by gates in dam just above station.

Accuracy.—Stage-discharge relation permanent except during very high stages. Rating curves well defined by frequent measurements. Gage-height record from water-stage recorder very satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for days of considerable variation for which were used the means of discharge obtained by applying to rating table the hourly gage height, and except for the period April 25–30, for which shifting-control method was used. Records excellent.

Cooperation.—Gage height record furnished and many discharge measurements made by Lower Sevier River Water Users.

Discharge measurements of Sevier River near Juab, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 7	L. W. Jordan	1.78	79
Nov. 23	.....do	1.85	96
Jan. 19	E. A. Porter	1.26	6.8
23	R. H. Becknell	1.26	6.2
Feb. 17	L. W. Jordan	1.27	8.5
Mar. 28	E. A. Porter	3.79	576
Apr. 12	.....do	4.24	697
May 11	.....do	5.32	1,060
June 24	E. A. Porter	3.74	576
July 3	J. W. Thurston	3.25	441
17	E. A. Porter	3.81	589
Aug. 1	.....do	2.38	217
8	J. W. Thurston	3.37	475
13	R. H. Becknell	3.11	402
Sept. 30	E. A. Porter	3.38	478

Daily discharge, in second-feet, of Sevier River near Juab, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	494	253	59	11	8	10	713	1,050	566	358	213	284
2	424	262	61	11	8	10	878	1,080	566	358	220	271
3	424	262	61	10	8	9	940	1,080	610	358	228	271
4	411	265	59	11	8	9	940	1,080	624	440	271	269
5	360	262	61	11	9	9	770	1,070	610	508	358	269
6	146	270	59	11	9	10	713	1,050	624	495	386	271
7	70	270	59	11	12	9	728	1,080	654	482	468	284
8	57	280	59	11	12	9	728	1,080	654	454	482	413
9	91	292	59	12	13	21	728	1,080	654	440	321	413
10	117	315	61	13	12	24	728	1,080	712	440	313	413
11	117	323	61	12	12	23	713	956	770	508	400	426
12	147	334	59	12	12	23	713	956	770	552	400	454
13	171	310	59	11	11	23	713	1,020	800	566	400	482
14	156	331	59	11	11	24	653	988	742	581	400	482
15	147	323	42	11	10	24	551	956	695	581	400	482
16	160	75	19	10	10	18	398	892	725	596	413	482
17	162	230	9	9	8	42	384	830	742	596	440	495
18	166	278	9	8	9	44	411	727	725	596	468	482
19	214	236	9	7	9	44	438	624	712	596	468	482
20	214	180	9	7	9	40	566	495	695	581	482	482
21	226	149	9	8	9	51	580	454	695	538	482	482
22	258	143	9	8	9	33	638	508	668	508	454	523
23	321	95	9	7	9	56	638	495	639	495	440	624
24	341	67	9	7	9	54	713	495	566	495	426	697
25	341	59	10	7	9	56	880	482	552	482	426	668
26	339	53	10	7	9	308	912	440	482	468	413	639
27	336	56	10	7	9	536	945	440	372	256	400	596
28	278	56	10	8	8	580	885	440	305	223	344	538
29	148	56	11	8	9	580	1,050	454	372	220	297	413
30	134	61	11	7	......	594	1,020	468	358	223	292	310
31	231	......	11	7	......	609	......	538	......	211	297	......

Monthly discharge of Sevier River near Juab, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	494	57	232	14,300
November	334	53	205	12,200
December	61	9	33.6	2,070
January	13	7	9.39	577
February	13	8	9.66	556
March	609	9	125	7,690
April	1,050	384	722	43,000
May	1,080	440	787	48,400
June	800	305	623	37,100
July	596	211	458	28,200
August	482	213	381	23,400
September	697	269	447	26,600
The year	1,080	7	336	244,000

SEVIER RIVER NEAR MILLS, UTAH.

Location.—In SW. ¼ sec .36, T. 14 S., R. 3 W., opposite milepost 682 on Los Angeles & Salt Lake Railroad (Lynndyl cut-off), about 7 miles below Mills post office, Juab County.

Drainage area.—5,800 square miles.

Records available.—April 22, 1914, to September 30, 1916.

Gage.—Stevens continuous water-stage recorder, with outside and inside staff gages, on left bank 500 feet above railroad bridge.

Discharge measurements.—Made by wading or from cable 100 feet above gage.

Channel and control.—One channel at all stages; stream bed is composed of heavy gravel and rock; permanent.

Extremes of discharge.—Maximum stage recorded during year, 5.74 feet at 7 a. m. April 30 (discharge, 1,070 second-feet); minimum stage 3.14 feet at 2 p. m. January 12 (discharge estimated 36 second-feet).

1914–1916: Maximum stage recorded, 6.71 feet May 27, 1914 (discharge, 1,910 second-feet); minimum stage, 3.14 feet at 2 p. m. January 12, 1916 (discharge estimated 36 second-feet).

Ice.—Stage-discharge relation not affected by ice.

Diversions.—Many diversions above.

Regulation.—Flow affected by operation of several dams and irrigation diversions above.

Accuracy.—Stage-discharge relation permanent. Rating curve very well defined. Gage-height record from water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph; discharge October 1–9, for which there was no gage-height record, estimated by comparison with records of flow at other stations on the river. Records excellent.

Cooperation.—Gage record furnished and some discharge measurements made by lower Sevier River water users.

Discharge measurements of Sevier River near Mills, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 10	L. W. Jordan	3.93	134	Mar. 29	E. A. Porter	5.08	608
Nov. 29	.....do	3.72	90	June 29	.....do	4.64	376
Feb. 16	.....do	3.48	59	Sept. 9	J. W. Thurston	4.72	420

Daily discharge, in second-feet, of Sevier River near Mills, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	500	268	90	54	61	61	663	1,000	531	415	249	325
2	510	292	90	56	64	60	832	1,040	542	396	249	312
3	455	296	92	57	65	60	925	1,040	542	387	257	304
4	455	304	93	57	67	60	962	1,040	553	382	268	296
5	440	304	92	59	70	65	888	1,000	564	451	347	292
6	395	304	93	60	72	66	755	1,000	564	483	410	292
7	175	316	92	60	73	62	731	1,000	580	483	425	288
8	105	316	92	54	75	61	735	1,000	586	476	526	364
9	95	329	92	64	72	61	735	962	586	446	425	436
10	148	338	93	65	75	66	741	962	592	420	342	425
11	150	356	93	56	64	68	741	962	632	430	374	441
12	153	364	93	49	60	68	735	925	657	483	420	461
13	192	356	93	63	60	68	731	925	682	505	430	478
14	205	351	93	58	60	68	735	925	689	526	430	494
15	185	364	95	57	60	68	645	962	651	537	430	494
16	192	276	86	60	61	68	537	925	695	542	430	488
17	195	172	71	57	64	65	441	867	682	553	425	500
18	195	288	62	49	67	84	441	811	689	559	476	510
19	215	300	52	72	74	89	461	682	689	564	471	500
20	238	257	57	68	78	90	537	564	676	564	483	494
21	231	205	54	55	72	95	609	494	663	548	500	500
22	268	188	54	60	74	98	620	472	663	515	505	488
23	304	145	54	65	70	84	657	494	651	499	488	575
24	347	122	54	60	65	103	663	483	609	488	478	676
25	360	112	53	61	62	103	797	472	586	510	467	702
26	360	100	52	62	61	138	925	467	548	494	451	663
27	356	92	51	57	62	472	925	446	467	436	441	632
28	347	92	56	65	64	586	962	451	387	296	405	603
29	288	90	52	54	62	609	925	451	405	265	360	521
30	140	87	55	63	......	614	1,040	456	420	261	329	420
31	188	......	54	55	......	620	......	488	......	257	325	......

Monthly discharge of Sevier River near Mills, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	510	95	271	16,700
November	364	87	246	14,600
December	93	51	74.3	4,570
January	72	49	59.1	3,640
February	78	60	66.7	3,840
March	620	60	157	9,650
April	1,040	441	736	43,800
May	1,040	446	767	47,200
June	695	387	593	35,300
July	564	257	457	28,100
August	526	249	407	25,000
September	702	288	466	27,700
The year	1,040	49	358	260,000

SEVIER RIVER NEAR LYNNDYL, UTAH.

LOCATION.—In the SE. ¼ sec. 27, T. 15 S., R. 5 W., at homestead of P. J. Flahive, 3½ miles southwest of Lynndyl, Millard County.

DRAINAGE AREA.—6,270 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 25, 1914, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank, with inside and outside staff gages, 1½ miles below highway bridge.

DISCHARGE MEASUREMENTS.—Made by wading or from cable a quarter of a mile above gage.

CHANNEL AND CONTROL.—One channel at all stages. Stream bed composed of fine gravel. Control permanent except for very high stages.

Extremes of discharge.—Maximum stage recorded during year 5.47 feet at 5 p. m. May 16 (discharge, 930 second-feet); minimum stage, 1.55 feet at 6 a. m. January 26 (discharge, 21 second-feet).

1914–1916: Maximum discharge recorded June 9, 1914 (discharge, estimated, 1,820 second-feet); minimum stage 1.55 feet at 6 a. m. January 26, 1916 (discharge, 21 second-feet).

Ice.—Stage discharge relation affected by ice.

Diversions.—Numerous diversions above station.

Regulation.—Flow affected by storage and irrigation diversions above station.

Accuracy.—Stage-discharge relation subject to slight change during high stages; affected by ice February 20 to March 8. Two well-defined rating curves used. Operation of water-stage recorder satisfactory except for periods covered by footnote to table of daily discharge. Daily discharge ascertained by applying to rating table the mean daily gage height determined from recorder graph by inspection. Records February 20 to March 8 roughly approximate; excellent for remainder of year.

Cooperation.—Gage-height record furnished by Lower Sevier River Water Users.

Discharge measurements of Sevier River near Lynndyl, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 11	L. W. Jordan	2.19	92	Apr. 11	E. A. Porter	4.46	615
Nov. 29	.....do	2.22	93	May 25	.....do	3.71	414
Feb. 16	.....do	1.74	36.4	June 23	.....do	4.28	571
Mar. 9	E. A. Porter	1.62	28.3	July 30	.....do	2.69	184
27	C. C. Jacob	1.84	50	Aug. 13	J. W. Thurston	3.18	295

Daily discharge, in second-feet, of Sevier River near Lynndyl, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	399	189	91	104	125	28	507	870	373	296	167	225
2	426	230	90	94	88	28	563	870	426	252	159	230
3	373	252	90	93	74	28	751	900	452	241	167	217
4	322	252	128	86	74	28	840	900	452	240	178	210
5	263	252	151	88	68	28	840	900	466	365	184	208
6	220	252	104	86	59	28	736	900	466	375	245	202
7	179	286	104	68	51	28	635	900	488	375	265	204
8	142	274	104	67	57	28	620	900	521	375	370	204
9	109	274	102	90	52	27	620	870	521	360	400	288
10	91	286	71	96	54	32	620	870	535	330	350	305
11	91	298	51	86	39	51	620	840	549	345	200	300
12	103	310	70	70	39	46	620	840	620	410	265	319
13	112	322	84	102	38	34	606	751	650	435	295	319
14	160	310	67	97	51	32	678	870	664	530	298	348
15	179	322	65	80	41	32	620	900	664	465	298	358
16	170	310	63	62	35	30	480	930	650	484	314	355
17	170	189	61	53	33	30	386	870	592	487	317	353
18	170	210	66	45	34	29	335	840	592	495	319	366
19	179	274	75	112	34	34	322	751	620	504	342	366
20	189	263	65	111	32	36	335	606	620	498	337	363
21	210	230	59	130	32	38	426	480	606	490	350	366
22	210	199	60	102	32	36	452	412	592	459	358	366
23	241	189	65	83	32	55	493	412	577	428	360	368
24	274	189	70	42	32	44	535	412	541	400	353	459
25	310	142	135	30	32	44	549	386	501	395	342	565
26	310	128	87	71	32	44	708	360	466	380	332	562
27	322	112	97	210	32	160	766	360	426	310	317	501
28	310	104	106	179	32	373	780	360	399	230	310	436
29	286	97	106	151	32	466	780	360	373	202	281	431
30	230	96	127	125	....	480	810	348	335	184	243	345
31	130	....	112	102	....	493	....	348	....	182	228	....

Note.—Daily discharge for Feb. 20–Mar. 8, July 4–14, 24–28, and Aug. 7–12 estimated by comparison with records obtained at other gaging stations on the stream. Water-stage recorder was not operating during these intervals.

Monthly discharge of Sevier River near Lynndyl, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	426	91	222	13,600
November	322	96	228	13,600
December	151	51	87.9	5,400
January	210	30	94.0	5,780
February	125		47.1	2,710
March	493		92.6	5,690
April	840	322	601	35,800
May	930	348	688	42,300
June	664	335	525	31,200
July	530	182	372	22,900
August		159	288	17,700
September	565	202	338	20,100
The year	930		299	217,000

DELTA AND MELVILLE RESERVOIR NEAR DELTA, UTAH.

Location.—In SE. ¼ sec. 26, T. 16 S., R. 6 W., at south end of diversion dam at head of canal A, about 8 miles northeast of Delta, Millard County.

Records available.—Irrigation seasons of 1914, 1915, and 1916.

Gage.—Inclined staff. Zero of gage is level with bottom of headgates in Canal A.

Daily gage height, in feet, of Delta and Melville reservoir near Delta, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							1915.						
1	(a)	5.40	5.44	5.56	5.22	3.92	16	3.22	5.03	5.40	5.50	4.00	5.30
2	(a)	5.59	5.21	5.42	5.18	3.99	17	3.35	4.98	5.63	5.49	3.98	4.96
3	(a)	5.55	5.20	5.47	5.08	4.14	18	3.40	5.14	5.58	5.42	3.84	4.60
4	(a)	5.49	5.22	5.50	4.95	4.50	19	3.40	5.28	5.47	5.43	3.72	4.30
5	(a)	5.48	5.29	5.50	4.95	4.50	20	3.27	5.51	5.44	5.40	3.64	3.98
6	(a)	5.50	5.44	5.58	4.86	4.54	21	3.39	5.49	5.14	5.40	3.40	4.09
7	(a)	5.44	5.26		4.84	4.62	22	3.45	5.28	5.04	5.50	3.16	2.48
8	(a)	5.45	5.21	5.58	4.80	4.65	23	3.46	5.53	5.20	5.48	2.97	2.51
9	0.91	5.56	5.00	5.49	4.77	4.76	24	3.40	5.56	5.33	5.50	2.82	2.05
10	1.94	5.49	4.87	5.49	4.69	4.94	25	3.51	5.54	5.40	5.55	2.67	1.35
11	2.11	5.44	4.74	5.44	4.57	5.22	26	4.10	5.41	5.42	5.50	3.17	(a)
12	2.40	5.37	4.57	5.46	4.49	5.48	27	4.76	5.28	5.62	5.50	2.31	(a)
13	2.62	5.23	4.51	5.42	4.36	5.45	28	4.78	5.46	5.51	5.46	3.45	(a)
14	2.79	5.15	4.71	5.50	4.20	5.39	29	4.82	5.53	5.38	5.38	3.63	(a)
15	3.08	5.04	5.02	5.56	4.09	5.42	30	4.90	5.56	5.56	5.35	3.70	2.03
							31		5.55		5.28	3.72	

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1916.				1916.				1916.			
1	4.00	4.15	3.85	11	4.75	4.50	3.20	21	3.60	5.50	3.80
2	4.00	4.20	3.98	12	4.66	4.55	3.16	22	3.45	5.53	3.78
3	4.14	4.30	3.98	13	4.55	4.60	3.28	23	3.13	5.52	3.75
4	4.86	4.40	3.98	14	4.50	4.53	3.30	24	3.00	5.46	3.65
5	4.78	4.35	3.98	15	5.20	4.87	3.39	25	2.85	5.30	3.55
6	4.75	4.30	4.00	16	5.08	5.15	3.45	26	3.04	5.20	3.20
7	4.60	4.35	3.81	17	4.88	5.45	3.70	27	3.50	5.20	2.96
8	4.55	4.49	3.55	18	4.65	5.45	3.60	28	3.70	5.07	2.63
9	4.70	4.49	3.55	19	4.30	5.37	3.80	29	3.98	4.75	1.97
10	4.75	4.49	3.35	20	4.00	5.40	3.86	30	4.02	4.35	(a)
								31		3.83	(a)

[a] Below 0 of gage.

SEVIER RIVER NEAR DELTA, UTAH.

Location.—In NW. ¼ sec. 27, T. 16 S., R. 6 W., 1½ miles below Delta spillway and 6½ miles northeast of Delta, Millard County.

Drainage area.—7,380 square miles.

Records available.—May 16 to September 24, 1912; March 1, 1913, to September 30, 1916.

Gage.—Gurley water-stage recorder on left bank at same datum as the inclined staff gage used prior to March 1, 1913.

Discharge measurements.—Made by wading or from cable about 100 feet below gage.

Channel and control.—One channel at all stages. Bed composed of firm clay and hardpan; right bank may be overflowed at extremely high stages.

Extremes of discharge.—Maximum stage recorded during year, 4.22 feet 9 p. m. April 5 (discharge, 880 second-feet); minimum stage, 0.57 foot March 18–23 (discharge, 23 second-feet).

1912–1916: Maximum stage recorded, 6.82 feet May 31, 1914 (discharge, 1,470 second-feet); minimum mean daily discharge, 15 second-feet July 26, 1914.

Ice.—Stage-discharge relation at times affected by ice.

Diversion.—Canal A of the Delta project takes out water 1½ miles above station.

Regulation.—Flow at station controlled by regulation of the Delta spillway and Sevier Bridge reservoir.

Accuracy.—Stage-discharge relation not permanent. Frequent discharge measurements define the rating. Several well-defined rating curves used. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined from recorder graph by inspection, except for ice period, and periods of changing control, for which shifting-control method was used. Records excellent.

Cooperation.—Gage-height record furnished and some discharge measurements made by Lower Sevier River Water Users.

Discharge measurements of Sevier River near Delta, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	L. W. Jordan	1.14	86	May 31	J. W. Thurston	1.59	166
12	F. W. Cottrell	.45	15.7	June 8	Porter and Thurston	2.18	302
14	do	.24	5.0	9	J. W. Thurston	1.98	257
18	do	.21	4.7	26	do	1.48	142
Nov. 5	J. C. Dort	.95	58	30	E. A. Porter	1.92	233
19	do	1.27	98	July 22	do	1.18	108
28	do	.92	54	27	do	.97	70
Jan. 11	E. A. Porter	1.03	69	Aug. 2	J. W. Thurston	.91	63
Mar. 11	do	.72	38	19	E. A. Porter	1.30	124
25	do	.58	20	31	Jacob and Porter	1.04	78
31	do	2.38	326	Sept. 4	E. A. Porter	1.05	82
Apr. 9	do	3.14	536	21	do	1.24	110
27	do	1.86	220	29	do	1.30	121
May 30	do	1.50	148	30	Thurston and Porter	1.00	67

Daily discharge, in second-feet, of Sevier River near Delta, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	245	254	60	64	54	37	386	322	163	160	68	115
2	245	118	57	63	54	37	510	346	215	154	60	105
3	240	75	59	63	54	37	525	358	238	156	63	98
4	177	69	68	65	54	35	432	382	240	151	61	93
5	109	61	68	68	51	32	853	395	228	147	70	99
6	113	72	258	68	53	38	760	382	222	147	110	87
7	110	85	336	65	57	35	620	370	255	186	132	92
8	95	86	203	63	58	33	532	382	282	152	144	96
9	65	86	151	63	64	33	546	395	256	151	174	98
10	44	89	123	72	65	32	575	395	254	151	253	105
11	44	89	95	73	63	39	560	395	258	170	217	89
12	38	96	79	69	58	38	532	370	273	148	153	79
13	31	109	84	64	48	26	489	360	273	142	136	89
14	30	117	96	61	48	25	351	365	273	160	132	96
15	29	121	98	64	48	24	382	395	268	186	130	102
16	30	126	82	66	48	24	320	421	213	198	130	98
17	30	118	72	64	48	24	192	462	237	184	124	102
18	29	98	64	57	48	23	126	475	245	174	127	105
19	30	101	57	57	48	23	117	370	256	202	139	113
20	37	121	57	54	48	23	115	233	279	209	130	112
21	50	75	59	54	48	23	124	178	245	196	122	112
22	55	68	63	54	48	23	136	167	215	170	119	107
23	64	63	65	54	48	23	160	149	235	180	122	108
24	60	60	63	54	48	27	184	138	220	190	129	165
25	58	59	63	54	48	31	186	156	192	190	130	329
26	58	58	75	54	48	64	190	147	158	157	129	337
27	59	55	79	54	39	65	201	138	140	82	125	256
28	85	59	65	54	41	130	258	138	134	60	120	120
29	85	60	64	54	39	314	264	134	131	68	117	112
30	72	61	65	54	......	412	269	145	184	64	103	124
31	41	......	65	54	......	361	......	158	......	70	103	......

NOTE.—Discharge estimated Jan. 20 to Feb. 4, and Feb. 13 to 26 on account of ice, by comparison with records of flow at other stations on the stream.

Monthly discharge of Sevier River near Delta, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	245	29	79.3	4,880
November	254	55	90.3	5,370
December	336	57	93.3	5,740
January	73	....	60.5	3,720
February	65	39	50.9	2,930
March	412	23	67.5	4,150
April	853	115	363	21,600
May	475	134	297	18,300
June	279	131	226	13,400
July	209	60	153	9,410
August	253	60	125	7,690
September	337	79	125	7,440
The year	853	23	114	105,000

GUNNISON BEND RESERVOIR NEAR DELTA, UTAH.

LOCATION.—In sec. 15, T. 17 S., R. 7 W., at south corner of reservoir, at head of Deseret canal, about 2 miles west of Delta, Millard County.

RECORDS AVAILABLE.—Irrigation seasons of 1914, 1915, and 1916.

GAGE.—Chain gage established June 19, 1914; readings represent depth of water on gate sill. Depths were measured directly with graduated pole prior to June 19, 1914.

Daily gage height in feet, of Gunnison Bend reservoir for the years ending Sept. 30, 1915 and 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							1916.						
1	......	12.15	12.80	9.50	9.75	8.10	1	10.80	10.00	10.30	11.05	8.98	9.76
2	......	12.40	12.15	9.50	9.70	8.00	2	11.00	10.00	10.05	10.90	8.85	9.73
3	......	12.45	11.95	9.50	9.55	8.00	3	11.10	10.25	9.90	10.75	8.75	9.70
4	......	12.55	11.95	9.45	9.50	8.05	4	11.20	10.35	9.80	10.75	8.68	9.66
5	......	12.50	11.85	9.40	9.40	8.00	5	11.30	10.50	9.75	10.77	8.52	9.65
6	7.80	12.70	11.80	9.45	9.35	8.10	6	11.40	10.60	9.70	10.78	8.40	9.60
7	......	12.70	11.80	9.70	9.20	8.10	7	11.20	10.55	9.60	10.80	8.50	9.60
8	8.70	12.60	11.90	10.10	9.00	8.20	8	11.00	10.55	9.54	10.80	8.58	9.61
9	......	12.40	11.90	10.50	8.90	8.20	9	11.04	10.45	9.60	10.87	8.70	9.62
10	......	12.35	......	10.70	8.75	8.20	10	11.50	10.45	9.55	10.70	9.00	9.70
11	10.65	12.20	......	10.70	8.55	8.30	11	11.60	10.45	9.50	10.50	9.04	9.81
12	10.80	11.80	11.90	10.50	8.50	8.45	12	11.60	10.40	9.50	10.30	9.72	9.86
13	10.90	11.40	11.90	10.30	8.50	8.55	13	11.45	10.50	9.55	10.00	9.80	9.90
14	11.00	11.10	11.90	10.00	8.50	8.80	14	11.50	10.55	9.58	9.91	9.85	9.92
15	11.40	10.70	12.00	9.70	8.35	8.95	15	11.40	10.45	9.60	9.80	......	9.98
16	11.40	10.35	12.00	9.50	8.40	9.10	16	11.75	10.40	9.67	9.80	9.85	10.02
17	11.30	10.00	12.00	9.30	8.40	9.20	17	11.70	11.05	9.72	9.85	9.85	10.05
18	11.30	9.80	12.20	9.30	8.40	9.30	18	11.65	11.40	9.85	9.80	9.90	10.09
19	11.30	9.65	12.05	9.30	8.30	9.40	19	11.70	11.90	10.05	9.82	9.95	10.12
20	11.30	9.60	11.85	9.30	8.25	9.55	20	11.20	12.20	10.20	9.87	9.98	10.22
21	11.20	10.05	11.60	9.30	8.20	9.70	21	10.90	12.10	10.60	9.90	10.03	10.28
22	11.10	11.10	11.45	9.15	8.20	9.80	22	10.70	12.00	10.72	9.90	10.05	10.40
23	11.25	11.80	11.10	9.30	8.20	9.85	23	10.60	11.80	10.95	9.82	10.05	10.45
24	11.25	12.15	11.00	9.40	8.10	......	24	10.45	11.55	11.03	9.80	10.00	10.51
25	11.15	12.75	11.30	9.60	8.10	10.00	25	10.35	11.40	11.30	9.87	9.98	10.78
26	11.00	12.80	11.10	9.70	......	10.10	26	10.35	11.30	11.42	9.90	9.96	10.40
27	11.50	12.70	10.60	9.80	8.20	10.25	27	10.25	11.20	11.50	9.88	9.96	12.01
28	11.75	12.60	10.20	9.90	8.20	10.30	28	10.15	11.05	11.42	9.56	9.90	12.36
29	12.00	12.65	10.00	10.00	8.20	10.45	29	10.05	10.90	11.30	9.40	9.85	12.32
30	12.25	12.90	9.70	10.00	8.25	10.70	30	10.00	10.70	11.12	9.20	9.83	12.32
31	......	12.85	......	9.90	8.10	......	31	......	10.45	......	9.10	9.78	......

SEVIER RIVER AT OASIS, UTAH.

Location.—In E. ½ sec. 33, T. 17 S., R. 7 W., about three-quarters of a mile northwest of Oasis, Millard County, 1½ miles below county bridge, locally known as Hinckley Bridge.

Drainage area.—8,080 square miles (measured on topographic maps).

Records available.—April 13, 1912, to September 30, 1916.

Gage.—Stevens continuous water-stage recorder on left bank, April 24, 1914, to September 30, 1916; vertical staff on county bridge, in the SW. ¼ sec. 22, T. 17 S., R. 7 W., April 13, 1913, to April 23, 1914; datum of vertical staff raised 0.15 foot December 19, 1913.

Discharge measurements.—Made from county bridge or by wading.

Channel and control.—Two channels at extreme high water, one channel at low and medium stages. Bed is composed of sand with slight vegetal growth. Control is ordinarily permanent during irrigation season.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 7.20 feet at midnight April 6 (discharge, 720 second-feet); minimum stage 1.50 feet August 8 and September 8 and 9 (discharge, 11 second-feet).

1912–1916: Maximum stage recorded, 9.45 feet June 12, 1914 (discharge, 1,580 second-feet); minimum stage 2.00 feet May 13 to 19, 1912 (discharge, 0.5 second-foot).

Ice.—Stage-discharge relation at times affected by ice.

Diversions.—Numerous diversions above station take practically entire flow during irrigation season; water passing gage at such times is largely seepage or return water entering below Gunnison Bend reservoir.

Regulation.—Flow controlled by storage reservoirs and diversion dams above station.

ACCURACY.—Stage-discharge relation permanent throughout the year. Rating curve well defined. Operation of water-stage recorder satisfactory except for period July 29 to September 20, during which staff gage readings to hundredths once daily were obtained. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records good.

COOPERATION.—Many discharge measurements made by engineers of Lower Sevier River Water Users.

Discharge measurements of Sevier River at Oasis, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	L. W. Jordan	1.68	14.7	Mar. 31	E. A. Porter	4.63	311
27	F. W. Cottrell	1.98	28.5	Apr. 8	.....do	5.17	393
Nov. 23	J. C. Dort	1.98	25.8	May 16	.....do	1.89	18.8
Jan. 11	E. A. Porter	2.80	80	June 22	.....do	1.64	15.7
Mar. 10	.....do	2.04	30	Sept. 21	.....do	1.54	11.6

Daily discharge, in second-feet, of Sevier River at Oasis, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	19	24	26	58	75	45	291	18	15	16	13	12
2	20	30	28	62	74	45	321	18	14	16	13	13
3	22	26	28	66	74	45	431	17	14	16	12	12
4	22	26	30	64	75	45	439	19	14	15	12	12
5	23	27	30	66	74	45	530	18	14	13	12	13
6	25	27	30	80	74	45	667	20	15	13	13	12
7	25	22	31	93	70	45	667	19	17	14	14	13
8	16	22	63	90	72	40	479	24	19	13	11	11
9	17	26	89	87	74	30	415	27	17	13	11	11
10	17	26	95	85	69	30	447	26	19	12	11	12
11	17	27	95	82	75	30	447	26	15	12	12	12
12	17	28	87	79	74	26	463	22	15	12	13	12
13	17	25	78	78	72	26	407	21	15	12	13	12
14	16	17	74	79	70	26	351	20	16	12	12	12
15	16	23	78	74	70	26	190	20	16	12	12	12
16	16	30	78	74	69	26	170	20	16	12	12	12
17	15	28	73	76	66	26	124	20	19	11	11	12
18	17	28	70	75	65	26	48	20	17	11	14	12
19	16	28	54	75	63	26	32	26	17	12	14	12
20	16	27	38	73	63	27	27	72	18	12	14	12
21	17	27	38	68	58	27	23	57	16	12	13	12
22	19	27	47	70	58	28	22	25	16	13	13	13
23	19	28	45	72	58	26	21	24	17	18	14	15
24	16	28	48	70	58	25	21	26	18	15	14	14
25	21	20	51	72	56	25	21	30	19	15	15	15
26	21	19	52	72	56	24	21	26	20	13	14	16
27	22	27	52	72	55	24	20	24	20	14	14	34
28	28	18	54	70	50	25	19	22	19	11	13	35
29	30	20	60	70	47	351	20	18	17	14	13	20
30	30	27	61	74	....	336	17	16	17	11	12	18
31	23	....	62	125	....	314	....	15	....	11	12	....

NOTE.—Gage height not recorded Jan. 31, May 16 and 17, Aug. 3, 4, 6, 9, 10, 14, 23, 24, 27, Sept. 1, and 10 to 20; discharge interpolated.

Monthly discharge of Sevier River at Oasis, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	30	15	19.8	1,220
November	30	17	25.3	1,510
December	95	26	56.3	3,460
January	125	58	75.8	4,660
February	75	47	66.0	3,800
March	351	24	60.8	3,740
April	667	17	238	14,200
May	72	15	24.4	1,500
June	20	14	16.7	994
July	18	11	13.1	805
August	15	11	12.8	786
September	35	11	14.4	858
The year	667	11	51.8	37,500

HATCH BENCH CANAL NEAR HATCH, UTAH.

LOCATION.—In NW. ¼ sec. 1, T. 37 S., R. 6 W., about half a mile below head of canal and 3½ miles southwest of Hatch, Garfield County, on road to sawmill.

RECORDS AVAILABLE.—May 15 to September 30, 1914; May 1 to September 30, 1916; discharge measurements in 1915.

GAGE.—Vertical staff nailed to side of wooden flume just below waste gate.

DISCHARGE MEASUREMENTS.—Made by wading about 100 feet below gage.

CHANNEL AND CONTROL.—Rectangular flume section, 4 feet wide at gage. Permanent control is afforded by free fall at lower end of flume.

DIVERSIONS.—None; this is the only diversion of any importance from Mammoth Creek above the gaging station, except the one at Panguitch Lake.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation fairly permanent. Rating curve fairly well defined. Gage read to hundredths once a week. Discharge for days when gage was read determined by applying gage height to rating table; discharge for intermediate periods obtained by interpolation; and monthly discharge determined by taking mean for the month. Determinations of monthly discharge roughly approximate only, owing to infrequent gage readings. No record of gage height available for 1915.

Canal diverts water from Mammoth Creek, probably in sec. 3, T. 37 S., R. 6 W. The water is used for irrigation in the vicinity of Hatch.

Discharge measurements of Hatch Bench canal near Hatch, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
July 28	0.92	13.4	May 19	0.96	13.9	Aug. 20	0.32	3.0
Aug. 24	.85	14.2	June 1	1.06	16.8	Sept. 13	.80	10.2
			29	1.02	16.4			

Monthly discharge of Hatch Bench canal near Hatch, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
May	14.3	880
June	16.8	1,000
July	13.3	820
August	2.6	160
September	10.0	590

STATE CANAL NEAR PANGUITCH, UTAH.

Location.—In NW. ¼ sec. 2, T. 35 S., R. 5 W., about three-quarters of a mile below head of canal and 3½ miles southeast of Panguitch, Garfield County.

Records available.—May 3, 1913, to September 30, 1916, during irrigation seasons only.

Gage.—Stevens continuous water-stage recorder on right bank at upper end of flume. Gage used May 3 to September 30, 1913, was a vertical staff nailed to right side of flume 15 feet from north or lower end. Zero of gage is grade of flume.

Discharge measurements.—Made by wading or from plank across flume.

Channel and control.—Wooden flume section. Canal bed above and below flume composed of clean gravel. Grade of flume about 0.4 foot below that of canal. Concrete cut-off wall at head of flume serves as control.

Diversions.—None above station.

Regulation.—Flow controlled by headgates.

Accuracy.—Stage-discharge relation changed frequently during 1915; three fairly well definied rating curves used; permanent during 1916; one fairly well defined curve. Operation of water-stage recorder satisfactory except for a few short breaks in record. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for days of considerable variation, for which were used mean discharge obtained by applying to rating table the hourly gage height. Records good.

Records indicate amount of water diverted from Sevier River for the Hatchtown project of the Utah State Land Board. Canal diverts water from Sevier River in sec. 14, T. 35 S., R. 5 W. The water is used for irrigation in vicinity of Panguitch.

Discharge measurements of State canal near Panguitch, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 18	J. J. Sanford	0.94	24	May 5	J. J. Sanford	1.13	28.5
30	do	1.12	29.6	19	do	1.52	41.5
June 15	do	1.54	50	June 1	do	1.54	47.3
July 2	Sanford and Jones	1.70	56	14	do	1.72	53
15	Porter, Sanford, and Jones.	1.56	46	29	do	1.82	63
				July 12	do	1.64	52
Aug. 11	J. J. Sanford	1.00	21	Aug. 20	do	.38	2.5
24	Sanford and Jones	1.06	23	Sept. 13	do	1.46	39.5
Oct. 1	J. J. Sanford	1.45	38				

Daily discharge, in second-feet, of State canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	23	8	22	15	20
2	23	9	21	16	20
3	23	10	20	17	23
4	24	11	20	18	32
5	24	12	20	19	33
6	24	13	20	20	36
7	23	14	20	21	38

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							1915.						
1	11	40	57	......	32	39	16	23	50	37	21	24	......
2	11	45	56	3.0	33	......	17	24	50	37	23	24	......
3	11	41	56	23	36	......	18	23	51	38	30	24	......
4	11	37	59	26	33	......	19	24	51	35	31	23	......
5	11	40	59	24	27	......	20	24	51	18	28	22	......
6	11	44	59	24	25	......	21	22	50	18	24	22	......
7	12	40	59	24	24	......	22	22	49	18	21	22	......
8	11	40	59	23	24	......	23	21	49	41	22	22	......
9	11	12	59	22	24	......	24	22	49	50	23	21	......
10	11	34	60	21	24	......	25	24	55	19	24	22	......
11	11	54	58	21	24	......	26	24	59	......	25	23	......
12	12	50	54	21	23	......	27	26	57	......	30	23	......
13	15	48	50	21	24	......	28	28	57	......	30	22	......
14	19	52	47	22	24	......	29	30	57	......	29	26	......
15	22	50	42	22	24	......	30	30	57	......	32	36	......
							31	34	......	......	31	......	......

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1916.						1916.					
1	25	46	60	2	44	16	44	55	30	4	42
2	25	50	58	6	44	17	44	56	25	5	40
3	25	54	54	10	43	18	44	55	22	8	40
4	25	54	54	5	43	19	45	56	26	8	40
5	25	54	54	4	42	20	44	56	32	13	39
6	27	54	56	3	42	21	39	58	34	26	36
7	29	54	55	3	42	22	37	57	34	31	37
8	31	54	54	2	43	23	34	57	35	37	38
9	32	54	52	2	46	24	34	56	25	39	38
10	33	54	54	2	44	25	36	56	14	41	38
11	34	55	51	2	44	26	37	56	14	42	38
12	36	54	53	2	42	27	41	57	14	42	39
13	38	54	56	2	40	28	40	58	14	44	40
14	44	54	54	4	42	29	44	58	3	46	40
15	44	54	37	4	42	30	48	60	8	50	40
						31	47	......	6	46	......

NOTE.—Defective gage-height record; discharge estimated, May 1-2, July 4-9, and Aug. 17-23, 1915, and May 1-4, 1916; discharge interpolated Aug. 12-13, 1915, and May 9, 11-12, June 5-8, 16, 22-23, July 25-28, 1916. Canal broken July 26 to Aug. 1, 1915, discharge zero.

Monthly discharge of State canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1916.		
October 1-21	24.2	1,010	May	36.5	2,240
			June	55.0	3,270
1915.			July	36.7	2,260
May	19.1	1,170	August	17.2	1,060
June	47.3	2,810	September	40.9	2,430
July	36.9	2,270			
August	23.3	1,430			
September	25.2	1,500			

LONG CANAL NEAR PANGUITCH, UTAH.

LOCATION.—In the W. ½ sec. 2, T. 35 S., R. 5 W., 1¼ miles below head of canal and 3½ miles southeast of Panguitch, Garfield County, on road to Hillsdale.

RECORDS AVAILABLE.—May 8, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder with outside and inside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Earth and gravel section. A permanent control is afforded by a wooden flume and diversion box just below gage.

DIVERSIONS.—East Bench canal diverts water a few feet below the gage.

REGULATION.—Flow controlled by head gates 1¼ miles above.

ACCURACY.—Stage-discharge relation permanent during periods of records, slight change between seasons of 1915 and 1916. One well-defined rating curve for each season. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined from recorder graph by inspection. Records excellent.

Canal diverts water from Sevier River in sec. 11, T. 35 S., R. 5 W. The water is used for irrigation in the vicinity of Panguitch.

Discharge measurements of Long canal near Panguitch, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 18	J. J. Sanford	1.22	52	May 5	J. J. Sanford	0.92	34
30	do	1.51	74	10	do	1.66	86
June 15	do	1.63	77	19	do	1.40	64
July 2	Sanford and Jones	1.82	90	June 1	do	1.52	72
15	Porter, Sanford and Jones.	1.57	78	14	do	1.34	58
28	J. J. Sanford	1.58	78	29	do	1.67	86
Aug. 11	do	1.35	60	Aug. 20	do	.54	13.7
24	Sanford and Jones	1.22	48	Sept. 13	do	.98	34.4
Oct. 1	J. J. Sanford	.97	34.7				

Daily discharge, in second-feet, of Long canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	May.	June.	July.	Aug.	Sept.	Oct.
1914–15.							
1	49	0	77	96	70	54	34
2	50	0	80	93		48	
3	51	0	74	91		42	
4	52	1.4	70	91		32	
5	50	16	66	88		22	
6	26	20	66	85		21	
7	53	18	68	84	71	21	
8	55	18	57	82	68	21	
9	55	18	30	81	64	21	
10	55	18	34	79	60	21	
11	55	18	67	79	63	21	
12	55	19	80	78	66	21	
13	55	20	82	77	61	21	
14	42	13	80	77	61	21	
15	36	8.5	82	76	59	21	
16	36	20	77	77	60	20	
17	35	36	73	77	65	20	
18	34	53	84	77	63	21	
19	33	50	85	70	60	22	
20	32	42	84	53	60	21	
21	31	40	84	52	58	26	
22		37	86	51	57	30	
23		38	87	54	53	30	
24		49	85	62	52	29	
25		55	86	78	51	29	
26		60	88	86	53	29	
27		32	89	78	56	29	
28		32	87	76	57	28	
29		65	89	75	56	30	
30		72	93	84	59	31	
31		76		85	56		

Daily discharge, in second-feet, of Long canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	32	74	84	......	69	16	......	68	60	43	......	18
2	......	32	74	84	......	68	17	......	67	84	49	......	18
3	......	32	74	84	......	67	18	......	64	82	48	......	18
4	......	32	75	83	......	65	19	......	64	81	53	4	19
5	......	32	76	82	......	53	20	......	64	82	62	14	20
6	......	32	76	84	......	46	21	......	61	82	68	22	20
7	......	......	75	86	......	47	22	......	66	82	74	54	20
8	......	......	74	87	......	50	23	......	78	88	74	51	20
9	......	......	75	87	......	53	24	......	78	88	76	51	20
10	......	83	76	93	......	50	25	......	75	87	66	51	19
11	......	81	75	86	......	43	26	......	72	86	50	50	19
12	......	76	70	80	......	36	27	......	71	86	24	50	20
13	......	74	66	76	......	36	28	20	71	86	15	57	20
14	......	73	61	69	......	30	29	32	73	85	6	72	21
15	......	71	56	45	......	18	30	32	75	84	2	82	18
							31	......	75	......	......	71	......

NOTE.—Discharge interpolated May 16–17, Aug. 8–9, and estimated 70 second-feet Aug. 2–6, 1915. Discharge estimated Apr. 28 to May 6, and July 29–30, 1916. No flow May 7–9 and July 31 to Aug. 18, 1916.

Monthly discharge of Long canal, near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1916.		
October 1–21	44.8	1,860	April 28–30	28.0	170
			May	57.2	3,520
1915.			June	77.3	4,600
May	30.5	1,880	July	61.9	3,810
June	76.3	4,540	August	20.3	1,250
July	77.2	4,750	September	34.0	2,020
August	61.6	3,790			
September	26.8	1,590			

EAST PANGUITCH CANAL NEAR PANGUITCH, UTAH.

LOCATION.—In NW. ¼ sec. 34, T. 34 S., R. 5 W., 200 yards below head of canal, 1½ miles southeast of Panguitch, Garfield County.

RECORDS AVAILABLE.—May 9, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder on right bank, with inside and outside gages.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Earth section. Concrete weir 15 feet below gage serves as control.

DIVERSIONS.—None above gage.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation permanent during 1916; changed once during 1915 season and during winter of 1915–16. Two fairly well defined rating curves for 1915, one well-defined curve for 1916. Operation of water-stage recorder satisfactory except for short periods during both years. Daily discharge ascertained by applying to rating table the mean daily gage height determined from recorder graph by inspection. Records excellent.

Canal diverts water from Sevier River in sec. 34, T. 34 S., R. 5 W. The water is used for irrigation near Panguitch.

Discharge measurements of East Panguitch canal, near Panguitch, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 18	J. J. Sanford	0.68	17.5	May 10	J. J. Sanford	1.10	39.1
30	.....do	1.08	36.2	19	.....do	1.02	35.0
June 16	.....do	1.17	41.5	June 14	.....do	1.10	40.6
July 2	Sanford and Jones	1.20	43.9	28	.....do	1.20	44.8
15	Porter, Sanford, and Jones	1.08	35.2	July 31	.....do	.55	11.6
28	Sanford and Jones	1.26	46.0	Aug. 20	.....do	.80	21.3
Aug. 11	J. J. Sanford	.94	29.5	Sept. 13	.....do	.85	23.5
Oct. 1	.....do	.64	13.8				

Daily discharge, in second feet of East Panguitch canal, near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	May.	June.	July.	Aug.	Sept.	Oct.
1914–15.							
1	17	......	41	47	43	27	13
2	17	......	47	43	40	42	......
3	17	0.8	47	46	28	48	......
4	17	.9	46	53	29	48	......
5	19	.9	44	46	34	45	......
6	14	.9	40	41	34	45	......
7	13	.2	45	40	36	41	......
8	13	1.7	53	38	31	38	......
9	13	2.0	63	43	28	37	......
10	12	2.0	61	47	28	37	......
11	12	1.8	56	44	27	36	......
12	11	1.0	52	41	26	36	......
13	11	0	47	37	30	36	......
14	11	0	44	37	31	30	......
15	10	16	43	39	30	23	......
16	11	16	45	44	32	20	......
17	10	16	52	43	41	20	......
18	10	18	28	38	30	21	......
19	10	18	22	37	25	21	......
20	10	15	59	29	24	21	......
21	10	14	60	28	23	20	......
22	......	15	58	29	23	20	......
23	......	14	56	41	24	20	......
24	......	16	57	44	26	20	......
25	......	22	60	51	25	20	......
26	......	27	56	51	23	21	......
27	......	32	54	50	21	21	......
28	......	37	52	47	27	21	......
29	......	36	46	46	20	20	......
30	......	36	48	45	24	15	......
31	......	37	......	44	19	......	......

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	39	39	43	21	34	16	......	39	35	24	23	25
2	......	40	54	41	11	31	17	......	36	40	24	23	25
3	......	40	64	40	26	30	18	......	35	45	33	22	33
4	......	40	66	38	21	29	19	......	34	43	35	22	33
5	......	40	68	35	28	41	20	......	40	41	31	21	11
6	......	41	69	41	24	43	21	......	42	47	31	20	11
7	......	41	68	46	24	43	22	......	41	64	30	19	10
8	......	41	65	46	24	45	23	......	46	62	26	18	10
9	......	40	61	45	24	47	24	......	46	60	24	30	10
10	......	39	60	44	31	45	25	......	43	57	21	43	10
11	......	38	57	41	28	48	26	......	38	55	18	43	10
12	......	37	51	40	17	28	27	25	35	53	16	43	10
13	......	43	45	37	25	24	28	39	37	49	14	38	10
14	......	48	38	34	24	24	29	39	39	47	13	35	10
15	......	41	34	23	23	25	30	39	39	46	13	50	10
							31	......	39	......	13	41	......

NOTE.—1915: Discharge estimated May 13–17, from range of stage indicated by recording gage.

1916: No gage-height record; discharge interpolated May 9, July 23–28, Aug. 7–8; discharge estimated from data furnished by Water Master, Apr. 27 to May 7. On June 29, estimated flow of 15 second-feet and on Sept. 13, 18 second-feet returned to river fron wasteway below the station.

Monthly discharge of East Panguitch canal near Panguitch, Utah, for the years ending Sept. 30, 1915, and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1916.		
October 1-21	12.8	530	April 27-30	35.5	280
1915.			May	39.9	2,450
May 3-31	13.7	790	June	52.8	3,140
June	49.4	2,940	July	31.0	1,910
July	42.2	2,590	August	27.2	1,670
August	28.5	1,750	September	25.4	1,510
September	29.0	1,730			

PANGUITCH CREEK ABOVE CANALS, NEAR PANGUITCH, UTAH.

LOCATION.—In SW. ¼ sec. 36, T. 34 S., R. 6 W., above all diversions and about 3 miles southwest of Panguitch, Garfield County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 20, 1915, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank with inside and outside staff gages. Gage reader, Omer Reid.

DISCHARGE MEASUREMENTS.—Made by wading near gage or from pole bridge 400 feet above gage.

CHANNEL AND CONTROL.—One channel at all stages; control fairly permanent except during high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 3.86 feet at 9 p. m., January 1, due to ice effect. Maximum open-water stage, 2.20 feet at 4 a. m., May 17 (discharge, 128 second-feet). Minimum stage recorded 0.57 foot at 10 a. m., January 28 (discharge 3 second-feet).

ICE.—Stage-discharge relation seriously affected by ice during winter.

DIVERSIONS.—Above all diversions.

REGULATION.—Flow regulated by storage in Panguitch Lake.

ACCURACY.—Stage-discharge relation not permanent; affected by ice during winter. Fairly well defined rating curves used October 20 to January 25, February 28 to April 16, April 22 to May 20, and June 1 to September 30. Operation of water-stage recorder satisfactory except for period July 15-29. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph or, for periods not covered by curves, by shifting control method. Records fair.

Discharge measurements of Panguitch Creek above canals, near Panguitch, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	J. J. Sanford	1.30	31.5	June 1	J. J. Sanford	1.88	75
Dec. 7	A. B. Purton	.91	14.6	14	.....do	2.00	88
Jan. 25	J. J. Sanford	.74	8.2	29	.....do	1.88	73
Feb. 28	.....do	.78	11.7	July 11	.....do	1.95	79
Apr. 16	.....do	1.45	50	31	.....do	1.36	40.8
22	.....do	1.14	45.6	Aug. 9	.....do	.78	12.7
May 5	.....do	1.10	40.3	18	.....do	.72	9.1
20	.....do	2.00	111	Sept. 12	.....do	1.38	44.7

Daily discharge, in second-feet, of Panguitch Creek above canals, near Panguitch, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	28	9.7	......	......	12	24	45	77	72	30	65
2	......	28	9.7	......	......	13	26	42	84	70	28	65
3	......	28	9.7	......	......	15	26	38	87	68	31	56
4	......	28	9.7	......	......	12	28	39	88	70	27	43
5	......	28	10	......	......	12	27	42	88	72	29	42
6	......	29	9.1	......	8.8	12	28	43	87	72	24	42
7	......	30	8.8	......	9.1	13	24	44	87	77	14	42
8	......	31	11	......	9.4	12	24	47	85	82	13	42
9	......	12	10	9.1	9.1	13	26	43	84	84	11	44
10	......	12	9.4	9.4	9.7	15	34	52	85	84	11	43
11	......	9.4	9.1	9.7	10	15	45	54	87	82	10	43
12	......	......	11	......	10	16	41	70	87	83	10	43
13	......	......	9.1	......	10	18	39	69	88	80	10	16
14	......	......	8.8	......	10	20	39	97	87	82	11	17
15	......	......	8.5	......	10	18	43	109	84	......	10	18
16	......	......	......	......	10	19	53	117	81	......	10	19
17	......	9.7	......	......	11	21	45	120	88	......	9.9	19
18	......	11	......	......	10	22	42	115	88	......	10	20
19	......	8.2	......	8.2	10	25	41	113	86	......	26	19
20	32	8.2	......	7.6	11	28	37	111	84	......	26	18
21	30	9.1	......	8.2	11	39	43	106	82	......	26	17
22	28	9.1	......	8.2	11	35	55	98	82	......	34	16
23	28	9.1	......	8.2	11	35	58	90	84	......	55	15
24	28	......	......	8.2	11	21	66	84	85	......	52	15
25	28	......	......	8.2	11	16	68	81	79	......	51	14
26	28	......	......	8.2	9.7	25	63	78	78	......	58	14
27	28	9.1	......	8.2	11	27	67	75	78	......	58	14
28	28	......	......	5.5	11	27	69	74	77	......	55	14
29	29	......	......	......	11	28	65	76	77	......	59	14
30	29	......	......	......	......	24	52	77	77	45	73	22
31	29	......	......	......	......	20	......	77	......	42	64	......

NOTE.—Discharge estimated on account of ice effect or missing gage-height record: Nov. 12–16, 24–26, 28–30, 9 second-feet; Dec. 16 to Jan. 8, 8 second-feet; Jan. 12–18, 9 second-feet; Jan. 29–31, 7.5 second-feet; Feb. 1–5, 8 second-feet; July 15–29, 62 second-feet.

Monthly discharge of Panguitch Creek above canals, near Panguitch, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October 20–31	32	28	28.8	684
November	31	....	14.5	863
December	11	....	8.8	539
January	....	....	8.3	508
February	11	....	9.9	567
March	39	12	20.3	1,250
April	69	24	43.3	2,580
May	120	38	75.0	4,610
June	88	77	83.7	4,980
July	84	42	67.5	4,150
August	73	9.9	30.2	1,860
September	65	14	29.0	1,730
The period	....	....	....	24,300

BARTON AND LE FEVRE CANAL NEAR PANGUITCH, UTAH.

LOCATION.—In sec. 9, T. 34 S., R. 5 W., 400 feet below head of canal, just below mouth of Threemile Creek, and 3½ miles southeast of Panguitch, Garfield County.

RECORDS AVAILABLE.—May 16 to September 30, 1915; April 26 to July 26, 1916; miscellaneous measurements made in 1914.

GAGE.—Vertical staff on left bank; read by Zera Church.

Discharge measurements.—Made by wading near gage.

Channel and control.—East section. Shifting control.

Accuracy.—Frequent changes in stage-discharge relation due to silting and scouring of canal bed. Rating curves poorly defined. Staff gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating table and by shifting-control method. Records only roughly approximate.

Canal diverts water from Sevier River on left side, in sec. 9, T. 34 S., R. 5 W. Water is used for irrigation in valley below.

Discharge measurements of Barton and Le Fevre canal near Panguitch, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 31	J. J. Sanford	1.20	9.4	May 10	J. J. Sanford	1.22	8.9
June 15	.....do	.87	5.6	June 2	.....do	1.20	7.3
July 1	Sanford and Jones	1.18	7.3	14	.....do	1.05	4.2
14	Porter and Sanford	1.00	6.2	28	.....do	1.07	5.0
29	Sanford and Jones	1.30	8.6	July 11	.....do	1.14	5.9
Aug. 11	J. J. Sanford	.80	3.7				
25	Sanford and Jones	.84	4.1				

Daily discharge, in second-feet, of Barton and Le Fevre canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1915.						1915.					
1	......	8.9	5.5	8.6	0.9	16	......	5.0	7.5	3.1	8.6
2	......	8.4	7.5	8.4	.9	17	......	0	7.7	9.0	8.8
3	......	10	7.3	7.0	0	18	......	6.0	10	7.3	7.9
4	......	7.5	7.7	7.5	0	19	......	7.1	6.2	7.3	7.7
5	......	7.5	7.5	6.6	0	20	......	4.5	11	7.0	5.0
6	......	7.5	7.5	5.7	0	21	......	4.0	9.2	7.0	4.1
7	......	7.8	7.5	5.0	8.8	22	......	0	8.8	6.8	3.1
8	......	7.5	8.3	1.1	8.6	23	......	0	9.9	6.6	2.9
9	......	9.7	6.0	4.1	8.6	24	......	3.9	10	5.9	2.9
10	......	9.7	5.2	3.9	8.6	25	......	6.4	9.2	4.0	3.1
11	......	9.5	5.6	3.5	7.7	26	......	5.7	9.7	3.1	2.8
12	......	7.3	5.0	3.7	7.9	27	......	5.5	11	3.5	2.8
13	......	13	4.8	2.9	7.9	28	8.2	5.7	9.5	2.3	2.2
14	......	13	6.8	2.8	7.7	29	8.4	5.7	9.0	1.5	0
15	......	7.1	7.1	2.9	8.1	30	8.4	5.9	9.2	1.4	0
						31	9.0	......	9.0	.9	......

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1916.					1916.				
1	......	3.5	8.5	4.3	16	......	4.2	3.9	3.4
2	......	3.5	7.3	3.4	17	......	7.1	3.8	2.6
3	......	3.5	7.2	3.5	18	......	6.0	3.9	1.8
4	......	3.5	6.4	3.5	19	......	5.9	4.6	2.3
5	......	3.5	5.8	3.3	20	......	7.0	4.9	2.5
6	......	3.5	5.7	3.1	21	......	5.8	5.1	4.5
7	......	3.5	5.6	3.1	22	......	4.8	6.0	4.5
8	......	3.5	5.7	5.8	23	......	7.8	5.8	5.3
9	......	3.5	5.5	7.4	24	......	7.6	5.8	5.3
10	......	9.1	5.4	6.6	25	......	6.6	5.1	5.3
11	......	8.5	5.1	6.4	26	3.5	5.6	5.1	5.3
12	......	6.5	5.0	7.1	27	3.5	5.5	5.1	0
13	......	6.2	4.7	6.2	28	3.5	5.7	5.2	0
14	......	6.6	4.6	7.3	29	3.5	6.4	5.2	0
15	......	4.9	4.7	7.3	30	3.5	6.4	4.8	0
					31	......	8.5	......	0

Monthly discharge of Barton and Le Fevre canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1915.			1916.		
May 28-31	8.5	70	Apr. 26-30	3.5	35
June	6.7	395	May	5.6	345
July	7.9	490	June	5.4	320
August	5.0	300	July	3.9	240
September	4.6	275	The period		940
The period		1,530			

McEWEN CANAL NEAR PANGUITCH, UTAH.

Location.—About on line between secs. 4 and 9, T. 34 S., R. 5 W., 100 feet below head of canal, just below mouth of Threemile Creek and about 3½ miles north of Panguitch, Garfield County.

Records available.—May 9, 1914, to September 30, 1916; irrigation seasons only.

Gage.—Stevens water-stage recorder, with outside and inside staff gages, May 9 to 25, 1914, when it was washed out by flood from Hatchtown reservoir; temporary vertical staff on left bank, 100 feet from head of canal, was installed July 2; 1914; replaced by Stevens water-stage recorder at original location May 19, 1915, datum lowered 1 foot. Gage reader, Zera Church.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of clay; fairly permanent.

Diversions.—None above gage.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation changed June 23, 1915, and on July 31, 1916, by sudden rise of river. Rating curves fairly well defined for each season. Water-stage recorder operated satisfactorily during 1916; record interrupted for short period in 1915, staff gage read. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for days of considerable variation, for which were used the means of discharge obtained by applying hourly gage height to rating table. Records good.

Canal diverts water from Sevier River, in the NW. ¼ sec. 9, T. 34 S., R. 5 W., about 100 feet above gage. Water is used for irrigation below Panguitch, on ranch of A. A. Church.

Discharge measurements of McEwen canal near Panguitch, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 31	J. J. Sanford	1.86	26.3	June 2	J. J. Sanford	1.03	21.7
June 15	do	1.58	22.5	14	do	1.28	25.4
July 1	do	1.42	28.5	28	do	1.10	23.8
14	Porter and Sanford	1.05	22.4	July 11	do	.85	17.3
29	Sanford and Jones	1.01	21.4	Aug. 9	do	.58	1.5
Aug. 11	J. J. Sanford	.90	19.5	Sept. 12	do	1.16	25.1
Oct. 1	do	.98	20.6				

Daily discharge, in second-feet, of McEwen canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.
1915.							1916.					
1	......	26	27	21	20	21	1	......	21	21	0.5	20
2	......	27	30	21	22	......	2	......	21	21	.5	19
3	......	27	30	20	24	......	3	......	21	21	.5	19
4		27	29	20	25	......	4	......	22	21	.5	19
5	......	26	29	20	25	......	5	......	23	21	.5	19
6	......	24	28	20	25	......	6	......	23	20	.5	21
7	......	25	24	20	25	......	7	......	23	19	.5	21
8	......	25	19	20	24	......	8	......	24	18	.5	21
9	......	26	23	20	24	......	9	......	27	18	1.3	23
10	......	26	22	20	23	......	10	......	27	18	1.3	22
11	......	25	21	19	23	......	11	......	28	18	1.1	23
12	......	22	22	19	22	......	12	......	28	16	1.0	24
13	......	22	21	19	22	......	13	......	27	16	1.0	23
14	......	21	22	19	22	......	14	......	27	17	.9	23
15	......	22	24	19	22	......	15	......	26	17	.7	24
16	......	21	25	19	22	......	16	......	26	17	.6	24
17	......	20	25	19	21	......	17	......	25	15	.5	24
18	......	20	26	19	21	......	18	......	24	14	.2	25
19	26	23	25	19	22	......	19	......	24	13	.1	25
20	16	21	24	19	22	......	20	......	26	13	.0	25
21	16	19	21	19	22	......	21	......	25	13	.0	25
22	16	17	21	19	22	......	22	4	24	12	.0	25
23	16	24	22	19	22	......	23	12	24	12	.0	25
24	16	33	20	19	22	......	24	13	23	12	.0	25
25	16	33	21	19	22	......	25	21	23	13	.0	25
26	16	31	22	19	22	......	26	21	23	15	.0	25
27	26	30	22	20	22	......	27	21	23	16	.0	25
28	28	30	22	20	22	......	28	21	23	16	.2	25
29	28	30	21	20	22	......	29	21	22	16	7.6	25
30	28	28	22	20	21	......	30	21	21	15	16.0	25
31	27	......	22	20	......	......	31	20	......	5	21.0	......

NOTE.—1915: Recording gage not in operation June 6–12; one staff gage reading daily. Discharge interpolated June 4, 13–14. 1916: Defective gage-height record, discharge estimated July 31 to Aug. 8, and Aug. 29–30. No flow Aug. 20–27.

Monthly discharge of McEwen canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1915.			1916.		
May 19–31	21.2	545	May 22–31	17.5	350
June	25.0	1,490	June	24.1	1,430
July	23.6	1,450	July	16.1	990
August	19.5	1,200	August	1.8	110
September	22.5	1,340	September	23.1	1,370

OLD HOUSTON CANAL NEAR PANGUITCH, UTAH.

LOCATION.—In the SW. ¼ sec. 4, T. 34 S., R. 5 W., at Church ranch, half a mile below mouth of Threemile Creek, and 3½ miles southeast of Panguitch, Garfield County.

RECORDS AVAILABLE.—June 1 to September 30, 1915; April 26 to August 2, 1916; some miscellaneous measurements during 1914.

GAGE.—Vertical staff, read by Zera Church.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Shifting gravel and clay.

ACCURACY.—Stage-discharge relation changed frequently during 1916. Rating curve for 1915 well defined; for 1916, several poorly defined curves. Staff gage read to hundredths once a day. Daily discharge determined by applying daily gage height to rating table and by shifting-control method. Records fair.

Canal diverts water from Sevier River for irrigation.

Discharge measurements of Old Houston canal near Panguitch, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*
June 15	J. J. Sanford	1.58	13.8
July 1	do	1.21	6.7
29	do	.92	2.7
Aug. 11	do	1.20	7.0
25	do	1.06	4.5
1916.		*Feet.*	*Sec.-ft.*
May 10	J. J. Sanford	1.78	22.8
June 2	do	1.58	13.1
14	do	1.08	3.9
28	do	1.32	7.1
July 11	do	1.48	7.9
31	do	1.04	2.8

Daily discharge, in second-feet, of Old Houston canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	June.	July.	Aug.	Sept.
1915.				
1	3.7	8.1	5.1	6.4
2	13	7.1	6.4	12
3	13	7.8	1.7	12
4	14	9.2	.7	13
5	13	9.2	.7	13
6	13	8.5	3.5	12
7	14	8.9	6.4	11
8	13	12	6.7	11
9	14	8.1	6.4	8.5
10	13	8.1	6.4	8.1
11	11	4.3	5.1	7.8
12	10	4.0	6.7	8.1
13	14	3.5	6.4	7.8
14	13	1.1	6.7	7.8
15	12	1.6	6.1	8.1
16	11	1.8	6.1	8.5
17	11	1.8	8.5	8.1
18	11	1.8	6.4	8.1
19	11	1.1	6.1	8.1
20	9.2	12	5.1	7.8
21	8.5	12	3.2	7.4
22	8.5	12	2.1	7.4
23	3.7	8.9	1.8	7.1
24	2.5	9.2	3.2	7.1
25	2.5	8.5	3.2	6.7
26	1.8	8.9	2.5	6.7
27	1.6	8.1	2.7	6.4
28	1.8	2.0	3.0	6.4
29	10	1.8	3.7	6.1
30	11	4.0	6.4	4.8
31	......	5.1	5.4	......

Day.	Apr.	May.	June.	July.	Aug.
1916.					
1	......	23	8	10	1.1
2	......	23	13	9.6	.5
3	......	23	13	9.4	......
4	......	23	12	9.4	......
5	......	23	9.4	8.9	......
6	......	23	5.1	8.9	......
7	......	23	10	8.3	......
8	......	23	11	7.8	......
9	......	23	12	9.0	......
10	......	22	12	8.9	......
11	......	22	4.4	8.7	......
12	......	21	4.4	8.7	......
13	......	21	3.8	8.3	......
14	......	18	3.6	9.9	......
15	......	17	3.3	13	......
16	......	17	3.1	14	......
17	......	15	2.9	11	......
18	......	15	12	11	......
19	......	15	2.5	10	......
20	......	15	5.1	10	......
21	......	13	4.8	10	......
22	......	13	5.4	10	......
23	......	13	6.7	8.5	......
24	......	12	6.7	8.5	......
25	......	11	10	8.5	......
26	12	9	10	10	......
27	23	9	6.7	9.9	......
28	23	9	6.7	9.6	......
29	23	10	10	8.5	......
30	23	7	11	1.5	......
31	......	4	......	2.0	......

NOTE.—1916: Discharge interpolated Apr. 27–30 May 1–3 and 5–8; estimated May 28 to June 1, June 29 to July 10 and July 14–15.

Monthly discharge of Old Houston canal near Panguitch, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1915.		
June	9.6	575
July	6.5	400
August	4.7	285
September	8.4	500
The period		1,760
1916.		
April 26–30	20.8	205
May	16.6	1,020
June	7.6	455
July	9.1	560
August 1–2	.8	5
The period		2,245

FOX CANAL NEAR CIRCLEVILLE, UTAH.

LOCATION.—In SE. ¼ sec. 3, T. 31 S., R. 4 W., 300 feet below head of canal and 3½ miles southwest of Fullmer store in Circleville, Piute County.

RECORDS AVAILABLE.—May 14, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder on left bank, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Earth section. Wooden flume with removable crest board just below gage.

DIVERSIONS.—None from canal above gage.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation changed several times during 1915 by removal and insertion of crest board on control. During 1916 these changes in control were less frequent. Several fairly well defined rating curves used. Operation of water-stage recorder satisfactory throughout each season. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for days of considerable variation, for which were used the means of discharge obtained by applying hourly gage height to rating table. Records fair for 1915 and good for 1916.

Canal diverts water from right bank of Sevier River, in sec. 3, T. 31 S., R. 4 W. Water is used for irrigation in vicinity of Circleville.

Discharge measurements of Fox canal near Circleville, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec. ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 28	J. J. Sanford	2.87	17.3	Mar. 30	J. J. Sanford	3.14	32.0
May 17	.....do	2.00	40.0	May 11	.....do	2.56	36.7
29	.....do	2.28	41.8	18	.....do	2.60	37.9
July 1	.....do	2.18	33.6	31	.....do	2.76	37.7
14	Porter and Sanford	a .94	6.1	June 13	.....do	2.32	30.4
27	J. J. Sanford	2.72	23.0	28	.....do	1.28	14.0
Aug. 10	.....do	2.36	14.2	July 11	.....do	b 1.30	13.9
23	.....do	2.07	8.1	29	.....do	c .12	2.9
Oct. 9	.....do	2.88	23.3	Aug. 18	.....do	1.76	28.5
				Sept. 12	.....do	d 1.42	21.6

a Crest board placed in control raising gage height to 1.84.
b With additional crest board in, gage read 2.33; board removed, 1.30.
c Crest board removed.
d Crest board replaced; board in, gage read 1.62; board removed, 1.42.

Daily discharge, in second-feet, of Fox canal near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	36	7	32	13	32
2	36	8	32	14	32
3	36	9	32	15	32
4	35	10	32	16	32
5	35	11	32	17	30
6	32	12	32		

Daily discharge, in second-feet, of Fox canal near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							1916.						
1	......	8	42	34	21	10	1	29	35	38	14	......	3
2	......	5	41	33	20	9	2	30	36	38	16	......	3
3	......	1	42	34	19	11	3	30	38	38	15	21	3
4	......	0	43	32	17	26	4	30	35	39	14	......	3
5	......	2	42	36	16	24	5	30	32	41	15	......	3
6	......	11	42	35	17	22	6	28	32	40	14	36	3
7	......	12	44	34	16	22	7	29	34	40	14	14	12
8	......	13	42	33	15	20	8	29	36	38	14	......	16
9	......	17	45	18	14	20	9	30	37	38	14	......	20
10	......	17	45	8	14	21	10	30	35	36	16	......	18
11	......	16	43	8	13	22	11	31	37	38	12	......	18
12	......	14	41	7	10	21	12	30	38	34	12	......	22
13	......	16	40	6	7	21	13	29	38	30	10	......	24
14	......	25	39	7	9	21	14	29	38	26	12	......	22
15	......	22	38	8	9	21	15	26	37	22	15	......	21
16	......	27	37	7	10	21	16	10	37	20	18	15	22
17	......	36	36	7	10	21	17	......	37	18	19	28	21
18	......	41	33	7	9	20	18	......	36	16	18	28	20
19	......	40	37	8	9	21	19	......	36	18	17	26	18
20	......	41	34	9	9	21	20	......	38	34	16	26	19
21	......	40	34	12	9	21	21	......	36	39	16	26	16
22	......	40	37	12	9	21	22	......	34	36	16	20	17
23	......	40	35	18	9	20	23	......	32	33	16	8	17
24	......	36	35	21	9	20	24	......	32	33	16	3	17
25	......	28	34	22	9	20	25	8	32	34	22	3	17
26	......	36	35	24	9	23	26	33	30	27	30	3	16
27	......	36	34	24	9	30	27	39	30	14	3	3	16
28	16	41	37	25	9	30	28	39	34	13	3	3	15
29	14	43	38	24	9	30	29	23	39	14	3	3	16
30	10	43	36	22	9	30	30	23	39	14	3	3	15
31	......	42	......	21	9	......	31	......	38	......	13	3	......

NOTE.—1915: Discharge estimated June 16–17, July 28, Sept. 28–30, and Oct. 1–9; discharge Oct. 1–9, 24 sec.-ft. 1916: Discharge estimated Apr. 26–27, 30, May 1–3, June 12–13, July 27–30, Aug. 16–17, 22–31, Sept. 1–6. No flow Apr. 17–24, Aug. 1–2, 4–5, 8-15.

Monthly discharge of Fox canal near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1915.		
October 1–22	32.7	1,430	October 1–9	a 23.9	430
1915.			1916.		
April 28–30	13.3	80	April	20.8	1,240
May	25.4	1,560	May	35.5	2,180
June	38.7	2,300	June	30.0	1,780
July	19.2	1,180	July	14.1	870
August	11.7	720	August	8.8	540
September	21.3	1,270	September	15.0	890

a Estimated.

CIRCLEVILLE CANAL NEAR CIRCLEVILLE, UTAH.

LOCATION.—In NE. ¼ sec. 3, T. 31 S., R. 4 W., three-quarters of a mile below head of canal, and 3 miles southwest of Fullmer store in Circleville, Piute County.

RECORDS AVAILABLE.—May 14, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder, with inside and outside vertical staff gages.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Earth section. Wooden weir 3 feet below gage serves as control.

Diversions.—Above all diversions from the canal.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation changed slightly at frequent intervals during 1915 and less frequently in 1916. Changes due to accumulation and subsequent removal of sand above crest of control.

Standard rating curve used for each year with shifts to parallel curves for changes in stage-discharge relation. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined from recorder graph by inspection; shifting-control method used for periods of change. Records good.

Canal diverts water from left bank of Sevier River in sec. 3, T. 31 S., R. 4 W. a short distance below head of Fox canal. Water is used for irrigation near Circleville.

Discharge measurements of Circleville canal near Circleville, Utah, during the years ending Sept. 30, 1915, and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 28	J. J. Sanford	1.20	56.0	Mar. 30	J. J. Sanford	0.55	19.8
May 4	.....do	1.08	54.0	Apr. 21	.....do	.48	17.2
17	.....do	.76	34.3	May 11	.....do	1.10	52.0
29	.....do	.92	44.9	18	.....do	1.08	48.2
July 1	Sanford and Jones	.82	33.7	31	.....do	.97	41.0
14	Porter and Sanford	.74	30.1	June 13	.....do	1.18	57.0
27	Sanford and Jones	1.10	49.5	28	.....do	.94	45.0
Aug. 10	J. J. Sanford	.72	27.0	July 11	.....do	.85	39.5
23	Sanford and Jones	.72	28.6	29	.....do	.97	42.9
Oct. 9	J. J. Sanford	.68	28.0	Aug. 9	.....do	.50	18.4
				Sept. 12	.....do	.78	34.0

Daily discharge, in second-feet, of Circleville canal near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914–15.								
1	52		54	44	34	31	60	36
2	51		53	45	33	29	60	34
3	51		54	45	33	28	61	33
4	50		54	47	33	28	58	31
5	48		54	47	35	29	54	31
6	46		55	46	34	30	51	31
7	46		56	45	34	29	47	31
8	46		54	45	36	28	48	31
9	46		54	46	40	27	46	30
10	46		54	52	39	28	45	
11	46		54	60	38	29	45	
12	46		55	59	35	28	45	
13	46		53	58	32	28	45	
14	46		49	64	30	26	46	
15	46		48	74	28	27	47	
16	46		43	66	26	28	46	
17	46		41	59	26	32	46	
18	46		50	54	27	30	45	
19	46		50	54	28	28	47	
20	46		49	51	30	28	47	
21	46		48	47	38	28	45	
22	44		48	44	37	28	43	
23			47	51	42	28	41	
24			47	58	44	30	40	
25			48	52	36	30	40	
26			48	46	47	30	40	
27			46	43	51	31	40	
28		55	46	40	46	31	41	
29		56	45	39	41	31	41	
30		55	45	36	35	31	38	
31			45		33	31		

Daily discharge, in second-feet, of Circleville canal near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	21	48	41	42	39	28	16	31	49	52	50	35	35
2	22	51	42	43	45	27	17	30	48	50	48	43	36
3	22	54	41	42	44	27	18	18	48	48	46	48	36
4	22	57	41	41	40	27	19	17	48	48	45	48	37
5	21	56	42	41	44	25	20	17	45	46	44	46	38
6	21	55	42	39	47	26	21	17	42	45	44	44	38
7	21	54	42	39	32	28	22	18	42	46	44	41	38
8	20	54	42	39	24	29	23	18	41	46	42	37	38
9	20	53	44	39	18	31	24	18	41	46	44	36	38
10	20	52	47	41	19	32	25	27	41	44	50	32	38
11	20	51	50	40	21	32	26	31	41	46	56	32	37
12	22	51	54	40	28	33	27	31	41	46	58	30	37
13	22	51	56	39	29	34	28	38	41	45	55	30	37
14	22	50	54	39	28	35	29	56	41	44	42	29	38
15	24	50	53	45	25	35	30	52	41	44	41	30	38
							31	......	41	......	51	31	......

Note.—1915: Recording gage clock stopped, discharge estimated from range of stage indicated by recorder, July 28-29, Aug. 21-22, Sept. 4-5, and Oct. 4-8; no gage record, discharge estimated from record of Sevier River at Kingston Aug. 28 to Sept. 2. 1916: No gage record, discharge interpolated May 2-3, 5-10, 13-17, 26-30, June 9-12, and 14-16.

Monthly discharge of Circleville canal, near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1915.		
October 1-22	46.9	2,040	October 1-9	32.0	570
1915.			1916.		
April 28-30	55.3	330	April	24.6	1,460
May	49.9	3,070	May	47.7	2,930
June	50.6	3,010	June	46.2	2,750
July	35.5	2,180	July	44.2	2,720
August	29.0	1,780	August	34.7	2,130
September	46.6	2,770	September	33.6	2,000

OLD KINGSTON CANAL NEAR CIRCLEVILLE, UTAH.

Location.—In SW. ¼ sec. 35, T. 30 S., R. 4 W., 200 yards below head of canal and 2 miles southwest of Fullmer store in Circleville, Piute County.

Records available.—May 14, 1914, to September 30, 1916, during irrigation seasons only.

Gage.—Stevens water-stage recorder on left bank with inside and outside staff gages.

Discharge measurements.—Made by wading 50 feet above gage.

Channel and control.—Earth section. Crest of wooden weir just below gage serves as control.

Diversions.—Not known.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation changed frequently during 1915 due to accumulation of silt above control; permanent during 1916 except for the period April 26 to May 13, on which dates sudden changes in flow caused changes in control. Several rating curves used for 1915 season; one well-defined curve for 1916 with a parallel curve through measurement made May 11, for the period April 26 to May 13. Operation of water-stage recorder satisfactory except for periods indicated in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records for 1915 good; for 1916, excellent.

Canal diverts water from right bank of Sevier River in the SW. ¼ sec. 35, T. 30 S., R. 4 W. Water is used for irrigation near Circleville.

Discharge measurements of Old Kingston canal near Circleville, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 28	J. J. Sanford	1.50	66	Apr. 21	J. J. Sanford	0.40	4.6
May 4	.....do	1.26	49.6	May 11	.....do	1.38	59
17	.....do	1.16	43.2	18	.....do	1.62	67
29	.....do	1.66	75	June 2	.....do	1.72	71
July 1	.....do	1.03	31.0	13	.....do	1.60	68
14	Porter and Sanford	.90	25.2	28	.....do	1.64	66
27	J. J. Sanford	1.71	73	July 11	.....do	1.12	39.1
Aug. 11	.....do	.89	26.8	29	.....do	.86	23.1
Aug. 23	.....do	.96	27.1	Sept. 12	.....do	1.50	58
Oct. 9	.....do	1.06	40.0	13	.....do	1.34	49.2

Daily discharge, in second-feet, of Old Kingston canal near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914-15.								
1	49	....	50	66	31	49	31	45
2	52	....	50	65	32	46	34	41
3	56	....	50	65	34	42	40	41
4	53	....	49	67	33	39	47	40
5	52	....	49	61	38	36	45	38
6	53	....	47	55	45	37	40	38
7	51	....	46	51	39	37	40	38
8	50	....	42	50	31	35	40	40
9	53	....	40	52	30	33	40	40
10	20	....	39	56	30	30	40	....
11	20	....	38	53	28	29	39	....
12	20	....	38	49	26	31	38	....
13	20	....	37	46	27	34	37	....
14	20	....	47	43	25	32	39	....
15	20	....	45	40	21	33	40	....
16	20	....	45	55	19	34	42	....
17	20	....	43	72	18	34	43	....
18	20	....	38	72	17	34	45	....
19	20	....	33	77	19	31	46	....
20	20	....	30	60	21	29	44	....
21	20	....	32	54	42	29	43	....
22	11	....	32	46	40	29	43	....
23	....	....	34	40	52	28	41	....
24	....	....	44	48	60	29	40	....
25	....	....	47	57	50	28	40	....
26	....	....	64	49	65	29	46	....
27	....	....	71	45	68	30	49	....
28	....	69	78	43	65	30	50	....
29	....	73	78	37	58	31	51	....
30	....	52	77	34	54	31	48	....
31	....	....	68	....	52	29	....	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	16	60	71	56	11	......	16	24	67	58	39	......	50
2	16	56	73	50	12	......	17	17	67	53	41	......	50
3	17	56	72	48	11	......	18	10	67	49	42	1	51
4	17	57	69	47	......	......	19	8	62	48	41	1	50
5	17	58	70	46	......	......	20	6	63	41	40	15	50
6	16	58	70	44	......	......	21	5	63	37	39	40	52
7	16	61	70	40	......	......	22	5	64	36	39	44	53
8	16	61	70	40	......	......	23	5	58	35	38	48	46
9	17	61	67	38	......	......	24	5	58	32	40	51	22
10	18	59	67	39	......	......	25	4	58	60	49	......	18
11	20	59	67	34	......	......	26	36	56	76	56	......	11
12	23	60	66	32	......	58	27	58	55	70	44	......	7
13	24	68	66	31	......	50	28	61	55	68	40	......	4
14	25	71	64	31	......	49	29	64	67	68	24	......	26
15	24	67	61	34	......	49	30	67	75	67	24	......	36
							31	......	68	......	30	......	......

NOTE.—1915: Inlet pipe clogged, discharge estimated May 1-3; interpolated May 15-16, 18-19. 1916: No gage-height record, discharge interpolated Aug. 22-23; estimated Aug. 25-31, 52 second-feet; Sept. 1-11, 55 second-feet. No flow Aug. 4-17.

Monthly discharge of Old Kingston canal near Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1915.		
October 1-22	32.7	1,430	October 1-9	40.1	715
1915.			1916.		
April 28-30	64.7	385	April	21.9	1,300
May	47.8	2,940	May	61.8	3,800
June	53.6	3,190	June	60.7	3,610
July	37.7	2,320	July	39.9	2,450
August	33.2	2,040	August	19.3	1,190
September	42.0	2,500	September	44.6	2,650

DALTON CANAL AT CIRCLEVILLE, UTAH.

Location.—In SW. ¼ sec. 25, T. 30 S., R. 4 W., 800 feet below canal heading and a quarter of a mile southeast of Fullmer store in Circleville, Piute County.

Records available.—July 1, 1914, to September 30, 1916; irrigation seasons only.

Gage.—Vertical staff on right bank 100 feet below spillway; read by J. P. Meeks.

Discharge measurements.—Made by wading or from pole bridge.

Channel and control.—Earth section. Row of stakes driven into canal bed just below gage serves as control at low stages.

Diversions.—None above gage.

Regulation.—Flow controlled by headgates.

Accuracy.—Stage-discharge relation changed frequently during each irrigation season. Rating curves fairly well defined. Staff gage read to hundredths once a day. Daily discharge ascertained by applying daily gage height to rating table, principally by shifting-control method. Records only fair.

Canal diverts water from left bank of Sevier River in sec. 35, T. 30 S., R. 4 W. Water is used for irrigation in and below Circleville.

Discharge measurements of Dalton canal at Circleville, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		Feet.	Sec.-ft.	1916.		Feet.	Sec.-ft.
Apr. 28	J. J. Sanford	4.28	14.5	May 18	J. J. Sanford	4.62	20.8
May 29	.....do	4.56	19.1	June 2	.....do	4.40	19
July 1	.....do	3.86	6.1	13	.....do	4.50	19.5
14	Porter and Sanford	4.26	11.6	28	.....do	4.38	15.8
27	J. J. Sanford	4.50	15.0	July 10	.....do	4.48	11.3
Aug. 11	.....do	3.54	2.6	29	.....do	3.76	2.0
23	.....do	3.94	8.2	Aug. 10	.....do	4.20	8.0
				18	.....do	4.42	13.5
1916.				Sept. 12	.....do	3.76	3.4
May 4	.....do	4.04	10.6				

Daily discharge, in second-feet, of Dalton canal at Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							1915.						
1	......	12.5	18	6.3	5.6	26	16	......	16	24	10	8.9	13
2	......	12.5	8.0	11	5.6	23	17	......	19	24	9.8	11	0
3	......	12.5	8.5	10	7.6	4.4	18	......	20	23	10	16	0
4	......	12.5	9.8	11	3.3	4.4	19	......	22	20	11	18	3.3
5	......	9.5	9.5	11	3.3	3.3	20	......	19	13	10	8.1	13
6	......	9.8	8.7	11	5.6	2.4	21	......	15	14	18	8.1	1.1
7	......	7.5	11	12	4.9	0	22	......	15	12	18	6.8	.8
8	......	8.0	12	11	3.3	7.8	23	......	12	10	20	7.6	6.1
9	......	8.0	12	11	2.9	7.6	24	......	18	0	0	7.1	6.1
10	......	9.5	14	10	2.2	7.3	25	......	18	0	24	6.8	2.2
11	......	12	14	14	2.9	12	26	......	0	0	28	9.5	7.1
12	......	12	13	11	3.3	6.1	27	......	10	22	13	10	8.1
13	......	16	15	11	3.7	3.6	28	......	10	20	7.8	11	15
14	......	17	15	11	5.4	19	29	15	16	20	6.3	11	15
15	......	29	24	11	8.7	20	30	15	13	19	11	9.2	13
							31	15	22	......	10	11.0	......

Daily discharge, in second-feet, of Dalton canal at Circleville, Utah, for the year ending Sept. 30, 1916.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1916.						1916.					
1	......	19	13	4	0	16	8	17	8	13	11
2	......	18	16	6	6	17	16	11	8	19	10
3	......	22	10	3	8	18	15	8	7	21	11
4	......	18	9	6	7	19	23	8	6	14	13
5	......	17	8	6	7	20	24	8	6	12	13
6	......	26	11	6	7	21	20	13	12	3	8
7	......	20	14	10	8	22	20	16	13	0	9
8	......	19	14	6	4	23	22	15	13	0	3
9	......	19	15	11	1	24	16	14	16	0	7
10	......	19	18	8	2	25	16	0	13	0	2
11	......	28	7	8	2	26	15	14	9	0	1
12	24	29	9	7	2	27	14	20	3	0	1
13	14	20	5	7	4	28	14	17	3	0	1
14	18	20	5	7	3	29	14	14	2	0	1
15	9	19	5	13	11	30	14	13	2	0	4
						31	14	......	2	0	......

Monthly discharge of Dalton canal at Circleville, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
Apr. 28-30	......	......	15.0	89
May	29	0	14.0	861
June	24	0	13.8	821
July	28	0	11.9	732
August	18	2.2	7.37	453
September	26	0	8.42	501
The period	......	......	......	3,460
1916.				
May 12-31	24	......	16.5	654
June	29	0	16.7	994
July	18	2.0	9.10	560
August	21	0	6.13	377
September	13	0	5.57	331
The period	......	......	......	2,920

MITCHELL SLOUGH CANAL NEAR JUNCTION, UTAH.

Location.—In NE. ¼ sec. T. 30 S., R. 3 W., several miles below head of canal and 2½ miles south of Junction, Piute County.

Records available.—May 15, 1914 to September 30, 1916, irrigation seasons only.

Gage.—Stevens water-stage recorder, with outside and inside gages.

Discharge measurements.—Made by wading.

Channel and control.—Earth section. Concrete weir just below gage serves as control.

Diversions.—None above gage.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation subject to changes in summer due to accumulation of moss and silt above control. Standard rating curve well defined. Operation of water-stage recorder satisfactory throughout each irrigation season, except as indicated in footnote to table of daily discharge. Daily discharge ascertained by shifting-control method and by directly applying to rating table the mean daily gage height determined by inspecting recorder graph. Records for 1915 fair; for 1916, good.

Canal diverts water from Mitchell Slough, probably in sec. 19, T. 30 S., R. 3 W. Water is used for irrigation above Junction.

Discharge measurements of Mitchell Slough canal near Junction, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 26	J. J. Sanford	0.72	14.6	Mar. 30	J. J. Sanford	0.42	4.5
May 17	do	.78	17.5	Apr. 21	do	.80	14.5
29	do	.75	16.6	May 3	do	.74	15.7
June 18	do	.75	14.0	11	do	.88	20.3
July 14	Porter and Sanford	.64	9.8	18	do	.92	24.8
27	Sanford and Jones	.74	15.6	June 13	do	.72	14.4
Aug. 10	J. J. Sanford	.62	9.9	28	do	.82	16.1
23	Sanford and Jones	.62	9.7	July 10	do	.70	13.2
Oct. 23	J. J. Sanford	.72	15.2	28	do	.86	20.3
				Aug. 10	do	.86	18.1
				Sept. 11	do	.88	22.8

Daily discharge, in second-feet, of Mitchell Slough canal near Junction, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	April.	May.	June.	July.	Aug.	Sept.	Oct.
1914-15.								
1	10	....	....	18	13	11	16	12
2	10	....	....	18	14	11	16	12
3	9	....	....	18	14	11	17	13
4	9	....	....	22	14	12	18	13
5	9	....	....	21	14	13	18	13
6	9	....	....	21	15	13	18	13
7	9	....	....	20	13	13	18	14
8	9	....	....	18	12	12	18	14
9	9	....	....	14	12	10	16	14
10	10	....	....	14	14	10	16	14
11	11	....	....	13	12	12	16	14
12	11	....	....	14	10	11	15	14
13	12	....	....	12	9.5	11	15	....
14	13	....	....	9.9	9.1	11	15	....
15	14	....	....	11	8.4	11	15	....
16	14	....	....	12	8.0	11	16	....
17	14	....	18	11	8.0	11	16	....
18	14	....	20	14	9.1	11	16	....
19	14	....	20	16	8.4	10	16	....
20	14	....	21	16	8.4	10	16	....
21	14	....	23	16	9.6	10	16	....
22	14	....	21	16	13	10	15	....
23	....	....	20	14	12	10	14	15
24	....	....	19	13	12	10	14	....
25	....	....	18	14	12	10	13	....
26	....	14	18	15	13	10	13	....
27	....	16	18	15	16	13	12	....
28	....	....	18	13	15	14	12	....
29	....	....	16	12	14	14	12	....
30	....	....	16	12	13	16	12	....
31	....	....	18	....	13	16	....	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	4	18	18	12	20	18	16	9	24	18	17	10	19
2	5	16	17	12	20	19	17	11	24	18	18	10	20
3	5	14	18	12	20	20	18	16	25	19	17	10	22
4	4	11	18	11	22	20	19	15	25	20	16	10	22
5	7	12	18	11	22	20	20	14	25	20	15	10	21
6	12	12	18	12	21	18	21	13	25	16	15	10	21
7	10	10	18	12	20	18	22	14	24	16	14	10	18
8	10	16	18	12	20	21	23	14	22	16	14	12	17
9	10	17	17	14	19	21	24	14	23	17	15	11	15
10	10	18	17	14	17	20	25	13	25	19	18	13	14
11	9	20	17	13	14	22	26	16	25	18	22	15	13
12	8	18	16	13	14	22	27	14	25	17	22	20	13
13	8	20	16	14	13	22	28	14	24	15	22	20	12
14	8	22	19	15	12	19	29	18	24	12	21	20	12
15	9	23	19	17	11	18	30	20	24	12	20	20	13
							31	......	21	......	20	21	......

NOTE.—1915: Recording gage clock stopped, discharge estimated from range of stage recorded; Apr. 28 to May 16, 16 sec.-ft.; Oct. 13-22, 14 sec.-ft. 1916: No gage-height record, discharge interpolated, May 1-2, June 8-12, and 27.

Monthly discharge of Mitchell Slough canal near Junction, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean)	Run-off (total in acre-feet).
1914.			1916.		
October 1-22	11.5	502	April	11.1	660
			May	20.4	1,250
1915.			June	17.2	1,020
April 26-30	15.6	154	July	15.5	946
May	17.4	1,070	August	15.7	959
June	15.1	898	September	18.3	1,090
July	11.9	732			
August	11.5	707			
September	15.3	910			
October 1-23	13.7	624			

JUNCTION MIDDLE CANAL NEAR JUNCTION, UTAH.

Location.—In NW. ¼ sec. 16, T. 30 S., R. 3 W., 1,000 feet due east of Piute County cheese factory and 800 feet below head of canal, which diverts from Sevier River 2¼ miles southeast of Junction, Piute County.

Records available.—May 17 to September 30, 1915; May 1 to September 30, 1916; some miscellaneous measurements made during 1914.

Gage.—Vertical enamel gage nailed to upstream wing of old wooden flume; read by Andrew Barnson.

Discharge measurements.—Made by wading near gage.

Channel and control.—Earth section. No permanent control. The Barnson spring flows into the canal about 150 feet below the gage, and at times a diversion dam is placed across the canal just below the spring.

Diversions.—Above all diversions from canal.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation subject to changes due to accumulation of silt and vegetation in channel below gage. Standard rating curve developed, parallel to which curves through various measurements were used. Staff gage read once a day to tenths. Daily discharge ascertained by applying daily gage height to rating table and by shifting-control method. Records fair.

Discharge measurements of Junction middle canal near Junction, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*
May 17	J. J. Sanford	4.18	9.6
June 18	do	3.79	3.2
July 14	Porter and Sanford	4.03	6.3
27	J. J. Sanford	4.28	8.5
Aug. 10	do	3.92	5.5
23	do	3.84	3.7
1916.		*Feet.*	*Sec.-ft.*
Apr. 21	J. J. Sanford	3.86	4.3
May 3	J. J. Sanford	4.18	3.9
11	do	4.14	8.5
18	do	4.47	11.4
June 13	do	3.78	3.0
July 10	do	4.04	5.7
28	do	4.10	1.6
Sept. 11	do	4.12	4.8

Daily discharge, in second-feet, of Junction middle canal near Junction, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	May.	June.	July.	Aug.	Sept.
1915.					
1		1.8	9.8	4.3	3.2
2		5.2	11	4.3	3.2
3		4.7	8.9	3.9	3.4
4		8.6	8.4	2.0	3.1
5		2.1	8.4	4.8	3.1
6		5.2	8.4	4.2	2.9
7		4.3	8.4	4.2	2.9
8		4.5	7.3	5.2	2.6
9		1.8	12	5.2	2.8
10		.1	13	6.2	2.9
11		3.4	7.3	6.2	2.1
12		1.8	7.3	6.0	1.8
13		2.6	6.9	5.2	3.2
14		1.8	7.1	5.2	3.2
15		1.2	7.3	5.2	2.1
1915.					
16		0	7.3	3.4	2.6
17	9.6	0	7.1	3.2	4.5
18	9.2	3.3	1.5	3.1	4.5
19	6.2	9.8	1.4	3.1	5.4
20	6.0	9.8	1.2	2.9	5.2
21	5.5	7.4	1.2	2.9	5.2
22	5.1	6.3	6.3	3.1	3.9
23	5.3	5.2	8.6	3.4	3.8
24	5.1	3.4	1.1	2.9	3.4
25	4.7	.4	6.3	2.9	3.6
26	3.5	0	8.1	2.8	3.4
27	0	4.8	8.4	2.6	2.1
28	0	4.6	8.4	2.8	3.4
29	0	4.2	8.1	2.9	1.8
30	0	2.4	7.4	2.9	1.8
31	4.0		7.4	3.1	

Daily discharge, in second-feet, of Junction middle canal near Junction, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1916.						1916.					
1	4	2	6	1	1	16	9	2	3	0	3
2	4	2	6	1	2	17	5	2	3	0	1
3	4	2	8	1	1	18	4	0	3	0	1
4	15	2	9	1	1	19	2	3	1	0	1
5	10	2	9	1	2	20	1	5	1	0	1
6	13	5	8	2	2	21	9	4	0	0	1
7	14	5	7	1	2	22	5	4	0	0	1
8	0	5	8	1	3	23	5	2	2	0	1
9	0	3	9	1	5	24	1	2	1	0	1
10	14	2	7	1	3	25	1	6	1	0	1
11	8	3	5	1	5	26	9	10	1	0	1
12	7	2	3	1	4	27	6	12	7	0	1
13	4	2	3	1	4	28	6	10	2	1	1
14	2	2	0	0	3	29	5	7	0	0	1
15	13	2	3	0	3	30	5	6	2	1	1
						31	4	......	2	1	......

Monthly discharge of Junction middle canal near Junction, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1915.			1916.		
May 17-31	4.3	127	May	6.1	375
June	3.7	220	June	3.9	230
July	7.1	439	July	3.8	236
August	3.9	238	August	.6	34
September	3.2	193	September	1.9	115
The period	....	1,220	The period	....	990

EAST FORK OF SEVIER RIVER AT COYOTO, UTAH.

Location.—In the NW. ¼ sec. 15, T. 31 S., R. 2 W., immediately below mouth of Coyoto Creek, half a mile below diversion to Otter Creek reservoir, and about half a mile southeast of schoolhouse at Coyoto, Garfield County.

Drainage area.—Not measured.

Records available.—December7, 1914, to August 15, 1915; August 1 to September 30, 1916. October 28, 1915, to August 31, 1916, a station was maintained about 4 miles below, but the flow is not comparable at these two points due to return flow between the stations.

Gage.—Vertical staff on right bank July 30 to September 30, 1916, and March 12 to August 15, 1915. Original gage vertical staff on left bank fastened to old bridge abutment just above present gage; different datum. Gage reader, Mazle King.

Discharge measurements.—Made by wading near station.

Channel and control.—One channel at all stages; stream bed sand and gravel, shifting at high stages.

Extremes of discharge.—Not determined; record fragmentary.

Ice.—No record during winter.

Diversions.—Canals divert for irrigation and storage above the station.

Regulation.—None other than diversions above mentioned.

Accuracy.—Stage-discharge relation unchanged from August 1 to September 30, 1916. Rating curve fairly well defined by measurements made during this period and the first part of the climatic year 1917. Gage read to tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of East Fork of Sevier River at Coyoto, Utah, during the year ending Sept. 30, 1916.

[Made by J. J. Sanford.

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
July 30	1.50	61
Aug. 21	.64	4.4
Sept. 14	.80	9.7

Daily discharge, in second-feet, of East Fork of Sevier River at Coyoto, Utah, for the year ending Sept. 30, 1916.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1	52	10	11	7	10	21	7	4
2	52	10	12	7	10	22	10	4
3	186	7	13	7	10	23	7	4
4	160	7	14	10	10	24	7	7
5	186	7	15	7	7	25	7	7
6	300	7	16	7	7	26	7	7
7	213	10	17	7	7	27	7	4
8	80	13	18	7	4	28	7	3
9	52	24	19	7	4	29	7	3
10	52	10	20	7	4	30	10	10
						31	13	....

Monthly discharge of East Fork of Sevier River at Coyoto, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
August	48.2	2,960
September	7.7	458
The period	....	3,420

EAST FORK OF SEVIER RIVER ABOVE OTTER CREEK, NEAR COYOTO, UTAH.

Location.—In W. ½ sec. 28, T. 30 S., R. 2 W., just above Otter Creek reservoir outlet, about 5 miles northwest of Coyoto, Garfield County, and 12 miles east of Kingston, Piute County.

Drainage area.—Not measured.

Records available.—November 1, 1915, to August 31, 1916. Station discontinued.

Gage.—Vertical staff on right bank, read by Delbert Moore.

Discharge measurements.—Made by wading near gage or from bridge at gage.

Channel and control.—Bed composed of sand and clay; shifting. Water overflows banks at high stages.

Ice.—Stage-discharge relation affected by ice.

Diversions.—Coyoto canal and Otter Creek reservoir feeder canal divert above station.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent; affected by ice in winter and backwater from Otter Creek reservoir outlet in summer. Several shifts in control occurred during the period of records. Rating curves poorly defined. Gage read to tenths once daily. Daily discharge determined by applying daily gage height to rating tables, by shifting control method, and by estimate. Records poor.

Discharge measurements of East Fork of Sevier River above Otter Creek, near Coyoto, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 28	J. J. Sanford	8.50	48.4	Apr. 20	J. J. Sanford	8.65	160
Dec. 6	A. B. Purton	8.59	57	May 20	.....do	7.55	41.1
Jan. 28	J. J. Sanford	7.50	21.6	June 2	.....do	7.20	23.1
Feb. 29	.....do	6.91	10.8	27	.....do	*a* 7.75	3.9
Mar. 31	.....do	8.00	89				

a Backwater.

Daily discharge, in second-feet, of East Fork of Sevier River above Otter Creek, near Coyoto, Utah, for the year ending Sept. 30, 1916.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	27	....	28	21	20	103	255	25	4	....
2	27	....	37	16	25	103	265	25	4	....
3	27	....	41	12	25	114	278	25	....	....
4	27	....	54	12	15	103	284	25	....	....
5	27	....	39	13	15	103	290	20	....	....
6	27	57	40	13	15	82	296	20	....	....
7	34	53	48	41	20	82	260	15	....	....
8	27	49	57	56	20	92	235	15	....	....
9	....	45	58	65	10	92	210	15	....	....
10	....	41	59	104	25	92	195	15	....	....
11	....	36	43	84	30	103	180	10	....	20
12	....	31	44	22	25	103	166	7	....	20
13	....	32	38	17	20	114	152	3	....	20
14	....	34	38	22	49	126	126	2	....	20
15	....	....	39	34	92	126	103	2	....	22
16	27	....	83	24	82	114	65	2	....	25
17	27	....	74	24	15	114	49	1	....	25
18	27	....	66	35	30	126	42	0	....	25
19	27	36	50	20	42	126	36	0	....	28
20	27	49	35	20	42	126	36	0	....	30
21	27	62	44	21	82	139	36	0	....	30
22	27	53	53	22	114	139	30	0	....	28
23	27	54	71	12	139	152	30	0	....	25
24	27	55	73	8	210	174	30	0	....	25
25	....	52	75	8	103	195	30	2	....	25
26	....	49	77	9	82	202	30	4	....	25
27	....	57	48	10	92	210	30	4	....	25
28	....	67	18	10	103	225	30	4	....	25
29	....	46	42	15	92	239	30	4	....	49
30	....	36	30	....	103	243	30	4	....	42
31	....	27	24	....	114	....	30	....	....	25

NOTE.—Discharge estimated on account of ice: Nov. 9–15, 28 second-feet; Nov. 25–30, 30 second-feet Dec. 1–5, 45 second-feet; Dec. 15–18, 35 second-feet. Stream dry June 18–24. Discharge estimated on account of backwater: June 25, 2 second-feet; June 26 to July 23, 4 second-feet; July 24–31, 50 second-feet; and Aug. 1–10, 110 second-feet. Discharge interpolated Nov. 23, Dec. 7, 9, 11, 13, 23, 25, 30, Jan. 14, 17, 19, 21, 24, 27, Feb. 2, Apr. 24, 26, 28, 29, May 1, 2, 4, 5, 8, 10, and 12.

Monthly discharge of East Fork of Sevier River above Otter Creek, near Coyoto, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
November	34	....	28.1	1,670
December	67	....	44.7	2,750
January	77	18	49.2	3,030
February	104	8	26.6	1,530
March	210	10	59.7	3,670
April	243	82	135	8,030
May	296	30	124	7,620
June	25	0	8.3	490
July	....	....	15.9	980
August	....	....	53.5	3,290
The period	....	....	....	33,100

EAST FORK OF SEVIER RIVER NEAR KINGSTON, UTAH.

LOCATION.—In SW. ¼ sec. 13, T. 30 S., R. 3 W., about a mile below highway bridge and 2 miles east of Kingston, Piute County.

DRAINAGE AREA.—1,260 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 29, 1914, to September 30, 1916. Records obtained about 1½ miles above Rockyford bridge, in the SW. ¼ sec. 16, T. 30 S., R. 2½ W., March 27, 1913, to April 28, 1914; also at gage three-fourths of a mile north of Kingston, in the NE. ¼ sec. 10, T. 30 S., R. 3 W., May 11 to September 20, 1912.

GAGE.—Stevens continuous water-stage recorder on right bank, 1 mile below highway bridge, April 24, 1914, to September 30, 1916; vertical staff 1½ miles above bridge March 27, 1913, to April 28, 1914.

DISCHARGE MEASUREMENTS.—Made from cable, highway bridge, or by wading.

CHANNEL AND CONTROL.—Stream bed is composed of gravel; shifts during floods. One channel at medium and low stages. Right bank is overflowed in high water.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 4.40 feet at 3 p. m. August 1 (discharge, 660 second-feet); minimum stage, 2.23 feet at 7 p. m. September 19 (discharge, 16 second-feet).

1913–1916: Maximum stage recorded, 4.40 feet August 1, 1916 (discharge, 660 second-feet); minimum stage, 1.00 foot September 19, 20, and 21, 1913 (discharge, 8 second-feet).

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Present station above all diversions in vicinity of Kingston; original site below all diversions.

REGULATION.—Flow affected by operation of gates in the Otter Creek reservoir dam 8 miles above.

ACCURACY.—Stage-discharge relation permanent until July 28, when a sudden rise scoured out the control; affected by ice during December, January, and February. Rating curve used October 1 to July 28 well defined; parallel curves used for rest of year. Operation of water-stage recorder satisfactory throughout year. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except for periods of shift, for which shifting-control method was used and for period of ice effect. Records good.

Discharge measurements of East Fork of Sevier River near Kingston, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 28	J. J. Sanford	2.80	52	June 3	J. J. Sanford	2.85	50
Dec. 5	A. B. Purton	2.86	56	27	do	3.73	266
Jan. 27[a]	J. J. Sanford	2.70	18.9	July 12	do	3.84	325
Feb. 28	do	2.58	28.5	28	do	4.09	461
Mar. 30	do	3.22	146	Aug. 8	do	4.06	512
Apr. 20	Sanford and Jacob	3.56	206	10	do	3.40	205
May 2	J. J. Sanford	3.82	316	21	do	2.38	26.9
12	do	3.84	325	Sept. 13	do	2.42	20.3
20	do	3.04	72				

[a] Frozen over at gage and control.

Daily discharge, in second-feet, of East Fork of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	25	49	50	....	27	120	385	52	317	427	26
2	23	29	49	....	26	112	327	51	317	435	25
3	23	26	29	....	25	115	313	51	317	440	25
4	26	24	30	....	26	122	299	49	317	440	25
5	26	23	58	....	41	122	299	49	317	450	23
6	25	23	58	....	41	112	308	49	317	450	23
7	25	25	55	....	32	103	327	48	317	507	22
8	26	27	33	....	29	99	355	48	317	468	22
9	26	27	30	....	29	105	355	48	322	277	24
10	25	28	29	....	35	108	346	46	327	209	22
11	23	28	29	41	33	108	341	46	327	181	22
12	34	27	29	40	30	152	322	45	327	163	22
13	33	27	28	33	36	130	262	43	327	151	21
14	33	35	28	31	60	130	180	43	327	154	20
15	33	39	28	31	33	135	138	40	327	154	19
16	31	29	24	33	29	148	99	38	336	154	18
17	22	28	....	35	33	170	80	38	327	151	17
18	22	28	....	35	44	218	73	38	317	125	17
19	21	27	....	35	47	230	72	108	317	42	17
20	22	27	....	36	55	215	76	128	317	27	26
21	21	29	....	32	70	197	73	130	317	27	193
22	21	29	....	29	105	200	68	130	317	27	249
23	21	31	....	29	130	215	66	132	317	26	249
24	23	29	....	28	170	234	62	135	317	25	245
25	22	26	....	27	132	258	61	246	322	24	249
26	52	25	....	27	120	294	58	271	341	23	257
27	53	26	....	29	125	332	56	275	385	28	253
28	49	25	....	30	140	370	53	299	445	27	253
29	49	35	....	28	148	405	53	308	453	28	253
30	49	50	....	....	135	405	53	313	441	28	253
31	49	....	....	....	120	....	53	....	430	26	....

NOTE.—Discharge interpolated because of broken gage-height record, Aug. 2-5, 19, and 20. Stage-discharge relation affected by ice Dec. 17 to Feb. 10. Discharge estimated as follows: Dec. 17–31, 22 second-feet; Jan. 1–31, 20 second-feet; Feb. 1–5, 30 second-feet; Feb. 6–10, 40 second-feet.

Monthly discharge of East Fork of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off total (in acre-feet).
	Maximum.	Minimum.	Mean.	
October	53	21	30.1	1,850
November	50	23	29.4	1,750
December	58	....	29.6	1,820
January	....	....	20.0	1,230
February	41	....	33.1	1,900
March	170	25	67.9	4,180
April	405	99	189	11,200
May	385	53	181	11,100
June	313	38	110	6,550
July	453	317	339	20,800
August	507	23	184	11,300
September	257	17	96.3	5,730
The year	507	17	109.5	79,400

COYOTO CANAL NEAR COYOTO, UTAH.

LOCATION.—About half a mile west of Riddle ranch house, half a mile south of mouth of Antimony Creek, and about 3 miles south of Coyoto, Garfield County.

RECORDS AVAILABLE.—July 30 to September 30, 1916.

GAGE.—Vertical staff on left bank; read by Douglas Riddle.

DISCHARGE MEASUREMENTS.—Made from footbridge.

CHANNEL AND CONTROL.—Earth channel; fairly permanent.

DIVERSIONS.—None above gage.

REGULATION.—Flow controlled by headgates.

ACCURACY.—Stage-discharge relation permanent during season. Rating curve not fully developed. Staff gage read once each day. Daily discharge ascertained by applying daily gage height to rating table. Records poor.

Discharge measurements of Coyoto canal near Coyoto, Utah, during the year ending Sept. 30, 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
July 30	5.30	16.8
Aug. 21	4.97	10.1
Sept. 14	5.01	8.8

Daily discharge, in second-feet, of Coyoto canal near Coyoto, Utah, for the year ending Sept. 30, 1916.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1	......	17	13	11	......	0	10	21	......	16	8
2	......	19	13	12	......	0	10	22	......	16	8
3	......	29	10	13	......	0	10	23	......	14	8
4	......	26	8	14	......	0	10	24	......	12	6
5	......	24	8	15	......	0	10	25	......	8	6
6	......	19	8	16	......	8	10	26	......	10	6
7	......	1	8	17	......	8	8	27	......	10	6
8	......	0	8	18	......	10	8	28	......	12	6
9	......	0	10	19	......	10	8	29	......	18	6
10	......	0	10	20	......	8	8	30	17	17	6
								31	17	16	......

Monthly discharge of Coyoto canal near Coyoto, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
August	10.5	646
September	8.5	504

OTTER CREEK ABOVE RESERVOIR, NEAR COYOTO, UTAH.

Location.—In sec. 25, T. 29 S., R. 2 W., three-quarters of a mile above Otter Creek reservoir and 10 miles north of Coyoto, Garfield County.

Drainage area.—Not measured.

Records available.—January 17 to August 10, 1915; October 1, 1915, to September 30, 1916.

Gage.—Vertical staff on right bank; read by Nelo Brindley.

Discharge measurements.—Made by wading near gage.

Channel and control.—Bed of stream composed of sand and gravel. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 4.08 feet at 8 a. m. March 12 (discharge, 87 second-feet); minimum stage recorded, −0.17 foot August 10 to September 8 (discharge, 0.6 second-foot).

1915–1916: Maximum stage recorded March 12, 1916; no flow August 10, 1915.

Ice.—Stage-discharge relation affected by ice.

Diversions.—Canals taken out for irrigation upstream.

Regulation.—One reservoir storing water for irrigation upstream; capacity unknown.

Accuracy.—Stage-discharge relation changed during winter, permanent thereafter. Rating curve for spring and summer period well defined below 50 second-feet; for period October to December, a parallel curve through measurement made December 6. Staff gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records good.

Discharge measurements of Otter Creek above reservoir, near Coyoto, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 6	A. B. Purton	1.68	27.2	May 2	J. J. Sanford	1.66	30.00
Jan. 28	J. J. Sanford	a 2.48	6.3	June 2	.....do	—.12	.82
Feb. 29	.....do	2.45	49.0	July 30	.....do	—.15	.96
Mar. 31	.....do	1.66	33.2	Sept. 15	.....do	+.22	4.3
Apr. 21	.....do	1.14	20.9				

a Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Otter Creek above reservoir, near Coyoto, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4	11	23	......	53	33	39	3	0.7	1	0.6
2	4	12	24	......	55	44	40	1	.7	5	.6
3	5	12	27	......	61	43	35	1	.7	7	.6
4	5	11	24	......	53	44	30	1	.7	7	.6
5	5	11	26	......	54	42	37	0.9	.7	7	.6
6	4	12	28	......	56	40	40	.9	.7	7	.6
7	4	28	32	......	68	39	45	.9	.7	7	.6
8	4	29	24	......	69	38	60	.9	.7	6	.6
9	4	25	31	......	71	36	58	.9	.7	6	4
10	4	23	24	......	83	36	56	.9	.7	0.6	4
11	4	22	27	......	90	36	57	.9	.7	.6	4
12	4	21	26	......	92	36	56	.9	.7	.6	4
13	4	23	23	......	90	36	45	.9	.7	.6	4
14	4	26	23	......	83	34	39	.9	.7	.6	5
15	4	56	26	......	84	34	30	.9	.7	.6	4
16	4	53	......	......	82	22	27	.9	.6	.6	5
17	4	33	......	......	77	23	30	.9	.6	.6	7
18	4	52	......	52	72	20	28	.9	.6	.6	7
19	4	24	......	44	64	19	27	.9	.6	.6	7
20	4	26	......	47	60	18	31	.9	.6	.6	7
21	4	27	......	54	63	18	18	.9	.6	.6	7
22	4	27	......	54	66	14	13	.9	.6	.6	7
23	4	30	......	52	74	11	13	.9	.6	.6	7
24	4	30	......	55	72	11	12	.9	.6	.6	2
25	5	34	......	58	71	14	11	.9	.6	.6	2
26	10	20	......	58	67	14	7	.9	.6	.6	2
27	11	18	......	56	64	16	5	.9	.6	.6	2
28	12	11	......	54	52	18	5	.9	.6	.6	2
29	12	44	......	52	47	36	5	.9	.6	.6	2
30	12	28	......	......	38	38	4	.9	.6	.6	2
31	12	......	......	......	32	......	4	......	.6	.6	......

NOTE.—Discharge estimated because of ice: Dec. 16–31, 25 second-feet; Jan. 1–10, 15 second-feet; 11–20, 10 second-feet; 21–31, 6 second-feet; Feb. 1–17, 30 second-feet.

Monthly discharge of Otter Creek above reservoir, near Coyoto, Utah, for the year ending Sept 30, 1916.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
October	5.6	343	May	29.3	1,800
November	26.0	1,550	June	1.0	58
December	25.4	1,560	July	.6	40
January	10.2	627	August	2.1	131
February	39.5	2,270	September	4.3	254
March	66.5	4,090			
April	28.8	1,710	The year		14,400

OTTER CREEK NEAR COYOTO, UTAH.

Location.—In W. ½ sec. 28, T. 30 S., R. 2 W., just below outlet of Otter Creek reservoir, 5 miles northwest of Coyoto, Garfield County, and about 12 miles east of Kingston, Piute County.

Drainage area.—Indeterminate; 400 square miles of Otter Creek basin tributary to reservoir, which receives also water from East Fork of Sevier River.

Records available.—June 21, 1913, to September 30, 1916; irrigation seasons only.

Gage.—Stevens water-stage recorder on left bank, with outside staff gage.

Discharge measurements.—Made by wading just below gage.

Channel and control.—Bed composed of gravel. One channel at all stages. Broad-crested concrete weir just below gage serves as permanent control.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 2.41 feet July 12, 13, 20, 23, and 24 (discharge, 328 second-feet); outlet gates closed during nonirrigation season and a flow of between 1 and 2 second-feet is maintained by seepage.

1913–1916: Maximum stage recorded, 2.67 feet at 3 a. m. July 4, 1914 (discharge, 393 second-feet); minimum flow 1 or 2 second-feet seepage when gates at dam are closed.

Winter flow.—Gates of reservoir usually closed. See preceding paragraph.

Diversions.—Some diversions for irrigation above reservoir.

Regulation.—Flow past station controlled by operation of outlet gates of reservoir.

Accuracy.—Stage-discharge relation permanent. Rating curve very well defined below 400 second-feet. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Discharge measurements of Otter Creek near Coyoto, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Dec. 6	A. B. Purton	0.24	[a] 1
June 27	J. J. Sanford	2.10	264
July 12	.....do	2.41	323

[a] Estimated.

Daily discharge, in second-feet, of Otter Creek near Coyoto, Utah, for the year ending Sept. 30, 1916.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1	......	11	316	318	6	16	......	15	324	156	4
2	......	13	313	316	6	17	......	15	322	157	4
3	......	12	313	316	6	18	......	39	322	64	5
4	......	12	313	318	6	19	......	115	324	21	12
5	......	12	311	270	6	20	......	118	328	15	50
6	......	12	313	192	6	21	......	119	326	9	228
7	......	12	318	152	6	22	......	121	326	8	246
8	......	12	318	152	6	23	......	119	328	7	244
9	......	12	318	150	5	24	......	172	328	6	242
10	......	14	316	150	5	25	......	270	326	6	244
11	......	15	324	150	4	26	11	266	326	6	246
12	......	15	328	150	4	27	11	282	324	6	244
13	......	15	328	150	4	28	11	322	322	6	244
14	......	14	326	154	5	29	11	318	322	6	242
15	......	12	326	156	4	30	10	316	322	6	244
						31	10	......	320	6	......

Note.—Reservoir gates opened May 26. During winter period gates are closed, but a seepage flow of about 2 second-feet passes the station.

Monthly discharge of Otter Creek near Coyoto, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
May	3.7	226	August	115	7,070
June	93.3	5,550	September	85.9	5,110
July	322	19,800			

OTTER CREEK RESERVOIR FEEDER CANAL AT HEAD, NEAR COYOTO, UTAH.

LOCATION.—In NW. ¼ sec. 15, T. 31 S., R. 2 W., just below passage of unnamed wash over canal and about half a mile southwest of schoolhouse at Coyoto, Garfield County.

RECORDS AVAILABLE.—December 8, 1914, to July 28, 1915, and August 1, to September 30, 1916.

GAGE.—Vertical staff on right bank fastened to old bridge abutment August 1 to September 30, 1916. Original gage used December 8, 1914, to July 28, 1915, vertical staff fastened to left abutment of same bridge. Gage reader, Mazle King.

DISCHARGE MEASUREMENTS.—Made by wading or from plank across flume.

CHANNEL AND CONTROL.—One channel at all stages. Control practically permanent; affected slightly by moss growth in summer.

EXTREMES OF DISCHARGE, 1914–15, 1916: Maximum stage recorded, 3.4 feet, May 8, 1915 (discharge, 225 second-feet). Minimum stage, canal dry, April 12–23, 1915.

ICE.—None.

DIVERSIONS.—None above station.

REGULATION.—Flow in canal regulated by head gates.

ACCURACY.—Stage-discharge relation not permanent. Several fairly well defined rating curves used for 1915; for 1916 fairly well defined curve developed from one measurement made during period of records and several made during climatic year 1917. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height direct to rating table and by shifting-control methods. Records fair.

Canal diverts water from East Fork of Sevier River in SW. ¼ sec. 15, T. 31 S., R. 2 W., for storage in Otter Creek reservoir.

Discharge measurements of Otter Creek reservoir feeder canal at head, near Coyoto, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1914.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Dec. 8	1.85	53	May 16	3.20	184	July 30	2.44	82
			June 1	3.02	151	Aug. 21	2.26	60
1915.			18	1.88	50	Sept. 14	2.05	43
Jan. 17	1.88	64	July 3	1.59	26			
Mar. 12	1.80	55	20	1.64	28			
Apr. 27	2.90	169						

Daily discharge, in second-feet, of Otter Creek reservoir feeder canal at head, near Coyoto, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1914–15.								
1	....	55	55	68	73	174	148	34
2	....	55	60	68	78	180	140	26
3	....	60	60	68	93	180	131	26
4	....	55	60	64	114	186	128	30
5	....	55	55	64	114	191	124	30
6	....	55	55	64	120	202	120	30
7	....	55	60	60	125	202	115	30
8	54	55	64	55	136	225	108	26
9	54	55	64	55	134	210	100	26
10	54	55	60	60	147	190	95	26
11	49	60	60	55	147	185	90	26
12	49	60	60	55	0	196	85	26
13	44	60	60	55	0	185	80	26
14	40	60	60	60	0	185	80	22
15	40	64	60	60	0	185	60	22
16	40	64	60	60	0	190	51	22
17	36	64	64	64	0	185	42	22
18	36	64	64	64	0	185	41	18
19	32	64	64	64	0	185	34	18
20	38	68	64	64	0	190	34	18
21	42	68	64	64	0	190	34	18
22	43	68	64	64	0	185	34	18
23	51	68	68	68	0	185	34	18
24	44	68	71	68	164	174	34	18
25	44	64	68	68	169	185	34	18
26	48	64	68	73	174	175	34	18
27	49	60	68	73	174	170	34	18
28	54	64	66	68	191	165	34	30
29	60	64	....	73	180	150	34	....
30	60	68	....	73	174	150	34	....
31	60	64	....	73	....	150	....	....

Day.	Oct.	Nov.	Aug.	Sept.	Day.	Oct.	Nov.	Aug.	Sept.
1915–16.					1915–16.				
1	34	41	48	48	16	34	....	90	44
2	34	41	90	48	17	34	....	77	44
3	34	41	175	57	18	41	....	66	44
4	34	41	90	57	19	41	....	66	44
5	34	41	48	48	20	41	....	66	44
6	34	41	215	48	21	41	....	66	44
7	34	41	41	57	22	41	....	66	44
8	34	41	66	77	23	41	....	66	34
9	34	34	120	104	24	41	....	77	34
10	34	34	77	44	25	0	....	77	34
11	34	22	120	44	26	0	....	77	34
12	34	....	120	44	27	0	....	66	34
13	34	....	104	44	28	0	....	66	41
14	34	....	137	44	29	0	....	77	57
15	34	....	104	44	30	0	....	66	77
					31	0	....	48	....

Monthly discharge of Otter Creek reservoir feeder canal at head, near Coyoto, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914-15.				
December 8-31	60	32	46.7	2,220
January	68	55	61.4	3,780
February	71	55	62.4	3,470
March	73	55	64.3	3,950
April	191	0	83.6	4,970
May	225	150	184	11,300
June	148	34	71.5	4,250
July 1-28	34	18	23.6	1,310
The period				35,250
1915-16.				
October	41	0	27.9	1,720
November 1-11	41	22	38.0	829
August	215	48	86.2	5,300
September	104	34	48.7	2,900

OTTER CREEK RESERVOIR FEEDER CANAL AT MOUTH, NEAR COYOTO, UTAH.

LOCATION.—In sec. 22, T. 30 S., R. 2 W., just above point where canal discharges into reservoir, about 4 miles north of Coyoto, Garfield County.

RECORDS AVAILABLE.—July 29 to August 15, 1915, and November 12, 1915, to September 30, 1916.

GAGE.—Vertical staff fastened to left side of rating flume; read by Delbert Moore.

DISCHARGE MEASUREMENTS.—Made from plank across flume.

CHANNEL AND CONTROL.—Artificial earth channel; rating flume forms a permanent control.

EXTREMES OF DISCHARGE, 1915-16.—Maximum stage recorded, 2.9 feet, March 23 and 24, 1916 (discharge, 219 second-feet); canal dry for short periods in October, November, and December, 1915

ICE.—None.

DIVERSIONS.—Some water diverted from this canal in vicinity of Coyoto for irrigation.

REGULATION.—Flow in canal regulated by head gates.

ACCURACY.—Stage-discharge relation not permanent; changed in March and again in August, 1916; slight changes at various times due to collection of debris in flume. Standard rating curve well defined. Gage read each day to tenths. Daily discharge ascertained by applying daily gage height direct to rating table, and by shifting-control method. Records fair.

This canal diverts water from East Fork of Sevier River, in SW. ¼ sec. 15, T. 31 S., R. 2 W., near Coyoto, for storage in Otter Creek reservoir.

Discharge measurements of Otter Creek reservoir feeder canal at mouth, near Coyoto, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
July 29	J. J. Sanford	1.12	20.5	May 3	J. J. Sanford	1.84	79
Dec. 6	A. B. Purton	.89	7.4	May 20	.....do	2.30	141
				June 2	.....do	1.60	60
1916.				27	.....do	.80	5.4
Jan. 28	J. J. Sanford	1.40	48	July 12	.....do	1.14	19.3
Feb. 29	.....do	1.48	58	30	.....do	1.72	71
Mar. 31	.....do	2.20	124	Aug. 21	.....do	1.54	55
Apr. 20	.....do	2.25	137	Sept. 14	.....do	1.42	38

Daily discharge, in second-feet, of Otter Creek reservoir feeder canal at mouth, near Coyoto, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	July.	Aug.	Day.	July.	Aug.	Day.	July.	Aug.
1915.			1915.			1915.		
1	......	22	11	......	14	21	......	......
2	......	22	12	......	12	22	......	......
3	......	22	13	......	12	23	......	......
4	......	22	14	......	12	24	......	......
5	......	22	15	......	14	25	......	......
6	......	23	16	......	......	26	......	......
7	......	25	17	......	......	27	......	......
8	......	25	18	......	......	28	......	......
9	......	20	19	......	......	29	21	......
10	......	14	20	......	......	30	23	......
						31	23	......

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.											
1	......	0	43	48	74	162	92	64	10	92	38
2	......	0	43	48	80	148	86	58	10	80	38
3	......	0	38	48	81	148	86	58	10	69	38
4	......	0	35	48	52	143	74	58	12	80	36
5	......	0	44	48	51	150	74	53	14	104	35
6	......	8	44	48	56	150	86	53	14	207	33
7	......	8	44	92	55	156	111	48	17	155	30
8	......	38	44	80	60	164	150	48	17	129	30
9	......	38	45	104	65	158	163	48	17	129	34
10	......	39	40	86	76	145	202	48	17	129	38
11	......	39	36	90	74	138	203	38	20	122	38
12	48	39	36	69	86	139	210	17	20	116	38
13	38	39	40	48	97	146	210	14	20	104	38
14	38	36	36	53	97	139	152	12	23	98	38
15	38	32	36	48	108	165	139	10	38	92	38
16	38	22	46	52	108	167	139	8	38	80	38
17	38	13	46	52	111	154	141	8	38	69	38
18	38	13	46	54	112	154	141	8	38	64	36
19	38	32	47	48	182	154	134	8	38	58	36
20	38	41	47	48	130	155	136	6	43	58	35
21	38	41	47	53	116	162	104	6	43	53	34
22	38	32	47	58	116	167	92	6	43	50	34
23	38	41	47	64	219	160	86	6	48	48	34
24	38	41	48	64	219	159	74	6	48	48	34
25	34	42	48	69	78	159	73	6	53	48	25
26	38	33	48	64	67	151	72	6	58	38	32
27	38	37	48	64	88	145	72	5	69	38	32
28	0	42	48	64	100	137	69	5	110	43	30
29	0	42	48	69	124	130	69	5	110	194	30
30	0	43	48	......	150	98	69	10	116	104	30
31	......	43	48	......	155	......	69	......	129	38	......

NOTE.—No gage height record, discharge interpolated: Dec. 14, 16; Aug. 9, 11, 14, 16, 18, and 22.

Monthly discharge of Otter Creek reservoir feeder canal at mouth, near Coyoto, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
November 12–30	48	0	32.5	1,220
December	43	0	28.2	1,730
January	48	35	43.9	2,700
February	104	48	61.4	3,530
March	219	51	103	6,330
April	167	98	150	8,930
May	210	69	115	7,070
June	64	5	24.2	1,440
July	129	10	41.3	2,540
August	207	38	88.3	5,430
September	38	30	34.9	2,080

KINGSTON CANAL AT KINGSTON, UTAH.

LOCATION.—In NE. ¼ sec. 15, T. 30 S., R. 3 W., 300 feet below head of canal, at east edge of Kingston, Piute County, on road to Coyoto.

RECORDS AVAILABLE.—May 15, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading 75 feet above gage.

CHANNEL AND CONTROL.—Bed composed of gravel. Crest of combination concrete weir dividing box in canal just below gage serves as control. Stage discharge relation affected at times during 1915 by movement of the dividing blade; permanent during 1916 season.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation changed at times during 1915; permanent during 1916 season. Rating curves well defined. Operation of water-stage recorder satisfactory throughout each season except for short periods as indicated in footnote to table of daily discharge. Daily discharge ascertained by shifting-control method and by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records for 1915 good; for 1916, excellent.

Canal diverts water from left bank of East Fork of Sevier River in the NW. ¼ sec. 14, T. 30 S., R. 3 W. Water used for irrigation near Kingston.

Discharge measurements of Kingston canal at Kingston, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 4	J. J. Sanford	1.36	29.3	May 2	J. J. Sanford	1.38	32.2
29	do	1.65	41.4	12	do	1.39	32.2
June 18	do	1.20	22.0	June 12	do	1.27	26.3
July 3	Sanford and Jones	.62	3.7	27	do	1.36	28.7
16	Porter and Sanford	1.38	31.7	Aug. 10	do	.98	14.5
Aug. 10	J. J. Sanford	1.22	25.1	Sept. 13	do	1.00	15.4
25	Sanford and Jones	.55	1.9				

Daily discharge, in second-feet, of Kingston canal at Kingston, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	10	9	10	17	14
2	9	10	11	18	15
3	9	11	11	19	16
4	10	12	12	20	16
5	10	13	12		
6	9	14	12		
7	10	15	13		
8	10	16	14		

Daily discharge, in second-feet, of Kingston canal at Kingston, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							1915.						
1	......	37	26	21	10	14	16	31	28	31	25	17	......
2	17	37	14	23	10	17	17	30	24	30	24	17	......
3	21	35	3.5	18	10	18	18	29	22	30	19	17	......
4	27	30	3.5	16	10	19	19	28	20	22	12	17	......
5	28	9.8	18	16	11	20	20	28	19	12	16	17	......
6	28	5.5	31	16	13	20	21	27	23	21	10	17	......
7	26	7.0	31	16	13	......	22	27	26	25	9.7	17	......
8	25	12	31	16	17	......	23	20	22	24	16	17	......
9	22	17	31	16	18	......	24	16	20	14	17	13	......
10	22	23	32	22	18	......	25	16	20	14	6.7	8	......
11	23	26	32	24	18	......	26	16	25	14	2	8	......
12	22	28	21	24	18	......	27	16	26	15	10	8	......
13	28	28	20	19	18	......	28	27	26	24	15	7.6	......
14	32	28	25	15	18	......	29	41	26	21	15	13	......
15	32	29	31	18	18	......	30	41	26	24	11	17	......
							31	39	......	24	10	......	......

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	34	23	27	24	23	16	14	26	22	1	22	16
2	......	32	24	28	16	24	17	19	24	22	2	22	14
3	......	33	26	26	15	12	18	20	24	22	7	20	13
4	......	32	23	18	16	5	19	20	24	22	16	11	12
5	......	32	26	17	15	3	20	19	24	23	24	6	19
6	......	32	29	17	20	4	21	19	24	24	26	10	13
7	......	18	30	19	20	5	22	19	24	24	26	19	21
8	......	17	32	27	18	7	23	19	24	25	26	16	20
9	......	34	30	30	16	9	24	20	23	26	23	13	20
10	......	34	30	28	17	11	25	20	22	26	14	10	20
11	......	34	29	24	21	13	26	22	23	28	15	13	20
12	......	33	28	23	16	15	27	23	24	32	15	15	19
13	6	32	28	23	15	16	28	30	25	32	19	17	17
14	6	30	27	17	19	15	29	35	26	30	25	18	17
15	10	24	25	3	22	16	30	35	26	28	24	24	17
							31	......	26	......	24	23	......

NOTE.—1915: No gage-height record; discharge interpolated May 18–19, July 2; estimated Oct. 7–15, 20 second-feet; Oct. 16–23, 1 second-foot. 1916: No gage-height record, discharge interpolated, May 26–29, June 19–23, Sept. 6–12.

Monthly discharge of Kingston canal at Kingston, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean)	Run-off (total in acre-feet).
1914.			1916.		
October 1–20	11.7	463	April 13–30	19.8	712
1915.			May	27.1	1,670
May 2–31	26.2	1,560	June	26.5	1,580
June	23.5	1,400	July	19.8	1,220
July	22.4	1,380	August	17.1	1 050
August	16.1	990	September	14.5	863
September	14.4	857			
October 1–23	12.9	587			

CLEAR CREEK AT SEVIER, UTAH.

LOCATION.—In SE. ¼ sec. 32, T. 25 S., R. 4 W., at Sevier, Sevier County, about 100 yards above confluence of stream with Sevier River. Dry Creek enters from the right about 2½ miles above and Mill Creek about 8 miles above the station.

DRAINAGE AREA.—150 square miles (measured on topographic maps).

RECORDS AVAILABLE.—February 23, 1912, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank, April 4, 1914, to September 30, 1916; vertical staff at same site February 23, 1912, to April 3, 1914; both gages at same datum.

DISCHARGE MEASUREMENTS.—Made by wading or from log bridge just above gage.

Channel and control.—Bed composed of sand and gravel. One channel at all stages. Concrete cut-off wall, installed just below gage August 31, 1914, serves as permanent control.

Extremes of discharge.—Maximum stage during year, from water-stage recorder. 2.36 feet at 5 a. m. May 9 (discharge, 153 second-feet); minimum stage, 0.76 foot at noon September 3 (discharge, 2.2 second-feet).

1912–1916: Maximum stage recorded, 3.15 feet May 24, 1914 (discharge, 240 second-feet); stream dry August 26, 1913.

Ice.—Stage-discharge relation not affected by ice except occasionally for short periods.

Diversions.—Cove canal diverts about three-quarters of a mile above the station.

Regulation.—None.

Accuracy.—Stage-discharge relation permanent; not affected by ice during year. Rating curve well defined between zero and 150 second-feet. Operation of water-stage recorder satisfactory except for two short periods in March and April. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Discharge measurements of Clear Creek at Sevier, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 4	A. B. Purton	1.12	16.7	June 5	J. J. Sanford	1.84	82
Jan. 21	J. J. Sanford	1.13	16.4	10	do	2.14	123
Mar. 9	do	1.39	35.6	22	do	1.70	66
25	do	1.48	44.8	July 8	do	1.57	50
Apr. 19	do	1.72	73	21	do	1.19	20.1
29	do	2.20	128	Aug. 15	do	1.06	13.2
May 26	do	1.74	67	Sept 15	do	.82	3.4

Daily discharge, in second-feet, of Clear Creek at Sevier, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	7.2	7.2	14.0	12.5	13.5	21.0	64	103	84	60	18.6	2.6
2	6.8	6.8	14.0	15.0	15.0	18.0	63	64	79	62	15.0	2.5
3	6.4	7.6	15.6	15.6	18.0	20.4	62	56	77	55	31.2	2.6
4	6.4	6.4	16.2	15.6	18.6	26.6	59	56	79	48	50.0	3.0
5	6.8	5.1	16.2	16.8	19.8	33.6	56	60	86	47	74.4	2.8
6	7.2	5.7	15.0	16.9	21.0	18.0	52	84	99	44	38.7	2.8
7	7.6	7.6	14.0	11.0	23.1	19.2	49	126	91	43	26.6	2.8
8	6.4	8.0	13.5	16.2	24.5	19.2	45	130	89	50	23.8	3.6
9	3.9	7.2	14.0	26.6	24.5	37.8	45	141	94	41	21.7	4.2
10	3.6	7.6	15.0	17.4	22.4	52.0	56	141	111	36	19.8	4.2
11	3.6	5.4	15.0	14.5	21.7	54.0	66	131	110	31	19.8	3.9
12	3.9	7.6	12.0	10.0	19.2	58.3	74	116	94	29	19.2	4.2
13	3.9	10.0	15.6	12.0	16.2	61.6	68	111	79	27	19.2	3.9
14	3.9	13.5	14.5	15.6	22.4	58.3	62	94	74	28	16.2	3.9
15	5.1	11.5	15.0	19.2	24.5	51.0	59	89	78	28	11.5	3.6
16	4.8	14.5	10.5	21.0	25.2	51.0	59	77	84	27	7.6	3.3
17	4.2	13.0	8.8	20.4	25.2	57.2	66	78	80	25	7.6	3.0
18	3.9	15.0	9.2	25.9	24.5	57.2	71	77	78	22	9.2	3.0
19	3.9	16.8	9.2	20.4	24.5	60.5	71	79	83	20	7.2	3.6
20	3.9	17.4	9.6	18.0	23.8	62.7	70	84	82	17	6.0	3.6
21	3.6	17.4	11.5	11.5	24.5	90.0	68	82	76	18	5.4	3.6
22	3.6	16.2	13.5	13.5	25.2	75.6	67	83	66	19	4.8	3.6
23	3.6	16.2	16.8	16.2	23.8	70.8	78	84	59	18	4.2	3.3
24	3.6	16.2	14.5	16.2	24.5	56.1	86	84	56	18	3.9	3.6
25	5.4	11.5	12.5	15.6	24.5	45.0	96	84	48	20	3.3	3.6
26	7.2	15.0	15.6	15.0	24.5	48.0	94	82	46	20	2.6	3.6
27	8.4	18.0	10.5	15.0	25.9	51.0	130	68	58	22	2.6	4.5
28	8.8	9.2	12.0	13.5	25.2	54.0	130	76	64	22	2.6	4.2
29	9.2	14.0	13.5	8.0	18.6	57.0	130	77	64	20	2.6	3.3
30	9.2	18.6	11.0	12.5	......	60.0	113	76	64	20	2.6	3.0
31	8.8	......	13.0	10.0	......	63.0	......	77	......	19	2.6	......

Note.—No gage-height record, discharge estimated, Mar. 26–31, Apr. 2, 5–7.

Monthly discharge of Clear Creek at Sevier, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	9.2	3.6	5.64	347
November	18.6	5.1	11.5	684
December	16.8	8.8	13.3	818
January	26.6	8.0	15.7	965
February	25.9	13.5	22.2	1,280
March	90	18	48.6	2,990
April	130	45	73.6	4,380
May	141	56	89.4	5,500
June	111	46	77.7	4,620
July	62	17	30.8	1,890
August	74.4	2.6	15.5	953
September	4.5	2.5	3.45	205
The year	141	2.5	33.9	24,600

COVE CANAL AT SEVIER, UTAH.

LOCATION.—In sec. 32, T. 25 S., R. 4 W., 90 feet below head of canal and about three-quarters of a mile west of post office at Sevier, Sevier County.

RECORDS AVAILABLE.—May 29, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder with outside and inside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading at gage.

CHANNEL AND CONTROL.—Earth section. Wooden weir just below gage serves as control.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation changed several times during seasons of 1915 and 1916, the changes being due to removal and replacement of flashboards on control. Several poorly defined rating curves used. Operation of water-stage recorder satisfactory throughout each season. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records fair.

Canal diverts water from left bank of Clear Creek in the NW. ¼ sec. 32, T. 25 S., R. 4 W. Water is used for irrigation between Sevier and Joseph.

Discharge measurements of Cove canal at Sevier, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 25	J. J. Sanford	2.22	20.8	May 26	J. J. Sanford	0.55	0.0
May 26	do	2.32	24.7	June 5	do	2.53	32.8
June 28	do	1.87	29.7	22	do	2.20	21.0
July 13	Porter and Sanford	1.60	24.9	July 8	do	1.87	23.7
Aug. 9	J. J. Sanford	.96	8.5	18	do	1.25	13.0
Sept. 17	do	1.00	7.2	21	do	1.01	11.7
				21	do	1.01	12.5
1916.				21	do	.70	7.6
Apr. 29	J. J. Sanford	1.56	19.0	Aug. 15	do	.70	6.3
May 1	do	2.38	17.7	Sept. 15	do	.71	7.9
17	do	2.05	20.3				

Daily discharge, in second-feet, of Cove canal at Sevier, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	12	8	12	15	10
2	12	9	17	16	10
3	13	10	10	17	10
4	18	11	10	18	10
5	14	12	10	19	10
6	13	13	10	20	10
7	11	14	10	21	8

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							
1	....	5.7	27	27	32	14	8.1
2	....	6.5	27	24	33	13	6.2
3	....	7.7	26	16	35	12	11
4	....	8.1	25	16	36	12	13
5	....	8.3	25	16	39	13	11
6	....	7.7	22	15	33	13	10
7	....	7.4	20	20	26	12	9.0
8	....	8.4	20	25	29	9.2	8.8
9	....	7.7	17	28	34	8.7	8.4
10	....	6.9	16	32	33	8.4	7.8
11	....	7.2	17	33	31	8.1	7.4
12	....	7.2	25	32	30	8.1	7.4
13	....	9.2	27	30	25	8.2	7.2
14	....	14	28	28	21	7.5	8.2
15	....	19	27	27	21	7.2	8.0
16	....	19	27	27	20	8.4	7.0
17	....	19	27	27	16	8.5	7.0
18	....	21	25	27	10	8.1	....
19	....	21	14	28	12	8.2	....
20	....	22	14	29	13	8.8	....
21	....	24	14	29	13	11	....
22	....	24	14	28	15	10	....
23	....	22	14	29	13	10	....
24	....	22	14	31	15	10	....
25	....	21	19	32	14	10	....
26	1.8	21	21	32	14	8.7	....
27	4.6	22	17	31	18	8.5	....
28	5.4	23	16	30	15	8.0	....
29	5.6	20	21	29	17	7.8	....
30	5.1	20	27	28	17	8.6	....
31	5.2	....	27	....	15	9.0	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	24	28	22	6	7	16	......	21	20	14	8	8
2	......	24	29	22	7	8	17	......	20	19	12	8	8
3	......	22	30	22	8	8	18	......	20	19	12	8	9
4	......	23	30	20	7	8	19	......	21	19	16	5	8
5	......	26	28	20	9	8	20	......	22	18	15	6	9
6	......	27	23	17	8	8	21	......	21	18	9	7	9
7	......	22	24	17	7	8	22	......	17	18	6	7	9
8	......	26	23	10	7	9	23	......	18	19	6	7	9
9	......	26	24	21	6	10	24	17	19	18	7	7	10
10	......	26	24	18	6	10	25	......	17	20	9	8	8
11	......	25	24	16	6	8	26	......	11	22	9	8	8
12	......	24	24	14	6	8	27	......	20	25	10	8	10
13	......	22	22	13	6	8	28	......	14	26	10	8	10
14	......	20	20	15	6	8	29	......	15	24	8	7	8
15	......	20	20	16	7	8	30	18	20	24	7	6	8
							31	......	27	......	6	8	......

NOTE.—1915: No flow Mar. 20–25. Discharge estimated Sept. 18–30, 7 second-feet. 1916: Discharge estimated Apr. 12–23, 2 second-feet; Apr. 25–29, 17.5 second-feet.

Monthly discharge of Cove canal at Sevier, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1914.			1915.		
October 1-21	11.4	475	September	7.9	469
1915.			1916.		
March 20-31	2.3	55	April 12-30	7.7	291
April	15.1	898	May	21.3	1,310
May	21.3	1,310	June	22.8	1,360
June	26.9	1,600	July	13.5	830
July	22.4	1,380	August	6.9	425
August	9.6	591	September	8.6	513

MONROE-SOUTH BEND CANAL NEAR JOSEPH, UTAH.

Location.—In sec. 27, T. 25 S., R. 4 W., 200 feet below head of canal, 2 miles south of Joseph, Sevier County.

Records available.—April 18, 1914, to September 30, 1916; irrigation seasons only.

Gage.—Stevens water-stage recorder on left bank, with inside and outside staff gages.

Discharge measurements.—Made from highway bridge half a mile below gage.

Channel and control.—Earth section. Bed of stream composed of sandy loam. Wooden weir 40 feet below gage serves as permanent control.

Diversions.—Above all diversions from canal.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation changed April 1, 1915; permanent during season of 1916. Rating curves well defined before and after change in 1915; one well-defined curve used in 1916. Operation of water-stage recorder satisfactory throughout each irrigation season. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Canal diverts water from right bank of Sevier River in the NW. ¼ sec. 27, T. 25 S. R. 4 W. Water is used for irrigation southeast of Joseph.

Discharge measurements of Monroe-South Bend canal near Joseph, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Mar. 20	1.02	31.6	Aug. 5	1.64	81	May 16	1.74	97
Apr. 24	1.72	91	21	1.51	70	29	1.90	105
24	1.72	88	Sept. 17	1.35	58	June 23	1.72	89
May 14	1.70	86	Oct. 12	.92	28	July 6	1.68	80
25	1.64	82				6	1.68	80
June 9	1.78	92	1916.			21	1.67	83
28	1.78	93	Mar. 9	1.11	41.4	Aug. 15	1.68	84
July 6	1.80	88	Apr. 25	[a] 2.04	91	Sept. 16	1.64	81
7	1.80	93	May 6	1.60	81	16	1.30	53

[a] Waste gates open.

Daily discharge, in second-feet, of Monroe-South Bend canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	49	11	42	21	35
2	52	12	35	22	35
3	50	13	35	23	35
4	49	14	35	24	22
5	48	15	35		
6	47	16	35		
7	45	17	35		
8	44	18	35		
9	43	19	35		
10	42	20	35		

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	......	26	84	88	91	79	50	......
2	......	38	84	89	91	80	48	......
3	......	42	84	89	91	81	47	......
4	......	56	83	89	91	81	46	......
5	......	66	84	90	92	81	46	......
6	......	73	84	90	94	81	45	......
7	......	80	83	91	95	80	43	......
8	11	84	84	91	95	80	43	......
9	11	84	86	92	94	80	45	......
10	11	87	86	93	94	80	48	......
11	11	90	86	94	65	80	48	......
12	31	92	86	92	48	80	48	28
13	31	92	86	92	70	79	47	......
14	31	83	86	92	83	79	47	......
15	31	82	84	91	82	78	50	......
16	31	81	84	92	82	78	54	......
17	31	80	85	94	81	77	57	......
18	31	85	85	94	80	76	55	......
19	31	89	87	94	80	76	54	......
20	31	88	88	94	80	76	56	......
21	31	88	88	94	80	64	54	......
22	31	87	87	94	80	57	53	......
23	31	85	84	94	79	56	51	......
24	31	87	83	94	79	56	47	......
25	31	88	81	94	79	56	43	......
26	31	88	81	94	79	56	46	......
27	29	88	81	93	79	56	50	......
28	21	88	82	92	79	54	50	......
29	20	88	86	91	79	53	50	......
30	20	85	87	91	79	52	56	......
31	20	......	88	......	79	50	......	......

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	88	102	88	84	80	16	63	92	90	82	86	82
2	......	85	99	86	84	79	17	61	93	90	83	86	81
3	......	82	100	85	84	78	18	75	96	89	83	87	80
4	......	82	87	85	83	77	19	85	100	90	83	87	78
5	......	82	81	85	84	77	20	85	104	90	83	86	80
6	......	82	85	85	85	79	21	85	103	90	83	85	80
7	......	81	86	86	85	79	22	89	102	90	82	85	79
8	......	81	87	86	85	82	23	92	102	89	82	84	78
9	......	78	89	85	85	82	24	98	100	89	82	83	77
10	......	76	92	85	85	82	25	93	100	89	81	82	76
11	......	76	92	84	85	82	26	87	92	88	73	82	75
12	......	75	89	83	84	82	27	87	96	89	50	82	75
13	......	82	72	82	78	81	28	87	105	89	59	81	74
14	......	93	37	82	88	82	29	87	105	89	83	81	74
15	52	93	40	82	86	81	30	87	105	89	84	80	73
							31	......	102	......	84	80	......

NOTE.—No flow April 1-14, 1916.

Monthly discharge of Monroe-South Bend canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1915.		
October 1-24	39.7	1,890	September	49.2	2,930
1915.			1916.		
March 8-31	25.8	1,230	April	43.8	2,610
April	79.0	4,700	May	91.4	5,620
May	84.7	5,210	June	85.9	5,110
June	92.1	5,480	July	81.5	5,010
July	82.2	5,050	August	83.9	5,160
August	70.7	4,350	September	78.8	4,690

SEVIER VALLEY CANAL NEAR JOSEPH, UTAH.

Location.—About on line between secs. 22 and 27, T. 25 S., R. 4 W., at station 20 on canal, 1½ miles south of Joseph, Sevier County.

Records available.—May 18, 1912, to September 30, 1916; irrigation seasons only.

Gage.—Stevens water-stage recorder on left bank, May 13, 1913, to September 30, 1916; original gage, used May 18, 1912, to May 12, 1913, was a vertical staff 10 feet above State weir, in the SE. ¼ sec. 15, T. 25 S., R. 4 W.

Discharge measurements.—Made from bridge 600 feet downstream or by wading.

Channel and control.—Earth section. Concrete weir 20 feet below gage serves as control.

Diversions.—Joseph canal diverts from right bank of Sevier Valley canal just above gage.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation changed several times in 1915 by placing flashboards on control and by accumulation of silt back of control crest. During 1916 these troubles were eliminated except for a few days in March, when there was very little water in the canal and flashboards were inserted to force water into Joseph canal. Several rating curves for 1915; one well-defined curve for 1916. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records good.

Canal diverts water from left bank of Sevier River about 1½ miles south of Joseph, in the NW. ¼ sec. 27, T. 25 S., R. 4 W. Water is used for irrigation in Sevier Valley as far north as Redmond.

Discharge measurements of Sevier Valley canal near Joseph, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Mar. 5	0.52	27.8	Aug. 31	2.24	126	Apr. 25	3.65	253
Apr. 25	3.65	225	Sept. 1	3.27	219	25	3.11	202
May 14	4.09	264	17	3.27	225	May 6	3.82	279
25	4.04	258	Oct. 12	2.30	135	16	3.82	274
June 8	4.07	260	Nov. 1	2.55	43.3	29	3.96	292
12	4.12	266				June 10	4.06	290
28	4.14	266	1916.			10	4.06	294
July 6	4.30	278	Mar. 8	2.28	39.6	22	4.05	300
23	4.29	280	11	2.66	21.5	July 6	4.06	297
Aug. 5	4.17	266	Apr. 7	2.18	135	Aug. 5	3.96	297
21	3.74	226	7	2.18	133	Sept. 15	3.91	279
28	3.74	223	19	3.54	244			

Daily discharge, in second-feet, of Sevier Valley canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	October.	Day.	October.	Day.	October.
1914.		1914.		1914.	
1	172	9	170	17	158
2	171	10	169	18	158
3	173	11	169	19	141
4	173	12	167	20	129
5	172	13	165	21	129
6	170	14	162	22	129
7	170	15	159	23	106
8	170	16	159	24	85

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.									
1	....	0	244	261	264	274	218	223	43
2	....	16	243	258	260	272	222	219	....
3	....	0	238	257	264	270	236	219	....
4	....	11	248	257	268	272	222	153	....
5	28	22	253	256	273	273	220	162	....
6	28	26	255	257	280	272	220	163	....
7	28	27	254	262	281	273	220	161	....
8	30	28	252	261	279	270	220	159	....
9	31	35	244	266	276	270	221	149	....
10	30	46	253	264	276	268	221	133	....
11	24	46	255	264	273	266	222	136	....
12	34	54	253	266	275	267	221	134	....
13	34	106	257	259	280	269	224	135	....
14	34	121	261	259	279	272	228	134	....
15	34	121	263	262	279	274	231	139	....
16	34	121	258	263	277	276	229	139	....
17	34	124	261	261	277	276	225	109	....
18	33	150	265	263	273	276	221	60	....
19	33	182	257	269	270	274	223	55	....
20	33	198	249	269	268	273	222	50	....
21	35	208	259	266	270	234	224	46	....
22	39	217	258	265	277	216	226	43	....
23	51	221	248	265	277	218	227	43	....
24	51	224	251	264	276	224	230	43	....
25	52	221	259	264	275	228	233	44	....
26	27	220	263	266	276	227	229	44	....
27	0	224	259	269	275	227	225	43	....
28	0	244	253	269	276	228	225	43	....
29	0	253	258	267	278	227	225	43	....
30	0	252	258	266	277	227	225	43	....
31	0	....	263	....	276	215	....	43	....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							
1	....	96	249	294	291	288	282
2	....	73	254	272	296	290	280
3	....	78	270	257	294	289	279
4	....	86	272	250	295	284	274
5	....	82	265	271	296	288	271
6	....	115	272	294	296	292	270
7	....	123	280	292	298	292	275
8	....	133	274	291	293	293	279
9	....	135	283	290	283	293	278
10	....	136	287	294	283	290	279
11	....	145	287	288	288	288	277
12	....	176	283	287	286	286	278
13	....	209	283	295	284	286	282
14	....	209	282	290	286	292	282
15	....	216	276	294	284	299	281
16	....	212	276	301	286	292	288
17	....	211	290	294	286	290	286
18	....	212	300	289	283	286	284
19	....	225	283	292	287	286	280
20	....	239	287	293	288	289	281
21	....	238	290	299	283	296	275
22	....	244	291	295	278	295	272
23	....	240	291	293	278	288	271
24	....	248	290	292	278	284	268
25	....	250	290	292	280	284	265
26	60	259	273	291	281	281	264
27	78	253	271	293	281	277	263
28	98	259	277	294	279	276	262
29	90	263	291	292	282	276	262
30	94	258	284	292	284	278	260
31	96	....	290	....	287	282	....

Monthly discharge of Sevier Valley canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1915.		
October 1-24	155	7,380	October	107	6,580
1915.			1916.		
March 5-31	28	1,500	March 26-31	86	1,020
April	124	7,380	April	187	11,100
May	255	15,700	May	280	17,200
June	263	15,700	June	289	17,200
July	274	16,800	July	286	17,600
August	255	15,700	August	287	17,600
September	225	13,400	September	275	16,400

SEVIER VALLEY CANAL NEAR RICHFIELD, UTAH.

Location.—In SW. ¼ sec. 8, T. 23 S., R. 2 W., at State weir or head of State extension canal, 100 feet below bridge on county road from Richfield to Aurora, about 3½ miles northeast of Richfield, Sevier County.

Records available.—May 21, 1912, to September 30, 1916; irrigation seasons only.

Gage.—Friez water-stage recorder on left bank at the weir, about station 815 on the canal.

Discharge measurements.—Made by wading or from bridge about 200 feet below gage.

Channel and control.—Channel is gravel and sandy loam. Wooden weir just below gage forms permanent control.

Diversions.—A great number of laterals divert water above the station; water passing the station is available for the State Piute project.

Regulation.—Flow controlled by headgates and numerous diversions above.

Accuracy.—Stage-discharge relation permanent during each irrigation season. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Discharge measurements of Sevier Valley canal near Richfield, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Apr. 22	1.63	79	Aug. 30	2.55	165	Apr. 28	2.30	141
22	1.66	84	Oct. 26	1.04	42.2	May 13	2.42	147
May 7	2.43	148				25	2.69	176
25	2.58	166	1916.			June 9	2.68	178
June 11	2.43	149	Mar. 10	.65	11.3	21	2.60	166
July 9	2.50	154	Apr. 6	1.22	52	July 17	2.83	190
12	2.50	154	6	1.41	62	Aug. 12	2.78	184
12	2.50	153	10	1.88	106	Sept. 7	2.43	149
Aug. 4	2.57	165	17	2.00	116			

Daily discharge, in second-feet, of Sevier Valley canal near Richfield, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							1916.						
1	......	122	165	158	163	157	1	11	135	169	154	168	153
2	......	128	160	153	158	161	2	11	122	174	168	160	149
3	......	120	169	145	164	172	3	40	142	142	162	172	148
4	......	124	173	156	167	167	4	49	153	137	163	210	134
5	......	134	165	158	160	158	5	59	132	132	160	160	151
6	......	136	163	163	157	160	6	69	131	177	172	138	156
7	......	144	172	161	165	160	7	88	146	179	174	170	158
8	......	154	168	160	159	169	8	102	148	173	176	191	177
9	......	147	156	160	160	170	9	100	150	175	159	197	179
10	......	155	156	158	158	163	10	92	153	176	161	193	178
11	......	156	152	141	152	175	11	88	152	165	172	192	164
12	5	151	165	151	162	167	12	104	143	164	162	185	164
13	8	154	156	160	170	169	13	133	136	172	144	189	156
14	10	160	151	167	164	178	14	128	150	168	160	192	168
15	10	160	148	162	161	178	15	114	147	170	166	198	176
16	10	153	160	154	173	172	16	108	149	172	176	189	176
17	10	154	160	157	177	171	17	113	160	168	181	184	180
18	30	154	157	158	173	165	18	104	166	172	166	172	180
19	60	154	160	157	169	157	19	104	167	178	160	161	170
20	70	160	170	154	163	162	20	141	164	175	156	156	171
21	75	168	154	154	138	174	21	130	178	159	159	165	183
22	80	175	153	161	115	170	22	122	180	172	170	163	183
23	84	169	152	169	120	171	23	121	173	167	174	154	180
24	94	165	155	170	135	172	24	133	170	166	162	150	183
25	96	163	153	173	151	173	25	130	175	162	174	152	172
26	103	179	159	170	160	170	26	128	177	159	151	156	182
27	109	156	160	176	153	174	27	126	169	174	172	148	199
28	123	167	160	170	156	165	28	129	171	169	180	144	202
29	134	166	158	169	158	164	29	132	183	167	168	151	200
30	127	165	164	175	158	167	30	130	174	159	174	145	202
31	......	169	......	172	153	......	31	......	170	......	172	152	......

NOTE.—1915: Discharge estimated by comparion with records at station near Joseph, Apr. 1-11, 2 second-feet; Apr. 12-21, as given in daily discharge table: Record discontinued Sept. 30 and an approximate idea of the flow Oct. 1-25 can be obtained by comparison with Joseph record.

Monthly discharge of Sevier Valley canal near Richfield, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
April	134	2	42.0	2,500
May	179	120	154	9,470
June	173	148	160	9,520
July	176	141	161	9,900
August	177	115	157	9,650
September	178	157	168	10,000
1916.				
April	133	11	101	6,010
May	183	122	157	9,650
June	179	132	167	9,940
July	181	144	166	10,200
August	210	138	170	10,400
September	202	134	172	10,200

STATE CANAL NEAR REDMOND, UTAH.

LOCATION.—In W. ½ sec. 14, T. 20 S., R. 1 W., at station 1,304 of canal survey, about 5 miles north of Redmond, Sevier County.

RECORDS AVAILABLE.—May 10, 1913, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens continuous water-stage recorder on right bank August 6, 1915, to September 30, 1916; May 10, 1913, to August 5, 1915, vertical staff on right bank.

DISCHARGE MEASUREMENTS.—Made from bridge 10 feet upstream from gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and hardpan; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.05 feet at 7 a. m. September 9 (discharge, 142 second-feet).

1913–1916: Maximum stage occurred in 1916.

DIVERSIONS.—Numerous diversions above gage.

REGULATION.—Flow controlled by headgates and by diversions above.

ACCURACY.—Stage-discharge relation not entirely permanent; assumed permanent during 1915; changed during period May 20–26, 1916. Rating curves fairly well defined. Staff gage read twice daily to hundredths prior to August 6, 1915; operation of water-stage recorder satisfactory after that date. Mean daily gage height obtained by averaging staff-gage readings for day or by inspecting gage-height graph. Daily discharge ascertained by applying mean daily gage height to rating table except for days of considerable fluctuation in stage, for which it was determined by averaging discharge obtained by applying hourly gage height to rating table. Records good.

State canal is an extension of the Sevier Valley canal. See Sevier Valley canal near Joseph for point of diversion from Sevier River.

Discharge measurements of State canal near Redmond, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*
July 10	2.93	87
19	3.33	108
Aug. 6	3.24	101
Sept. 4	3.20	102
29	1.05	8.1
1916.	*Feet.*	*Sec.-ft.*
Apr. 28	0.90	6.8
May 15	2.20	52
27	2.92	81
June 20	1.76	28.4
July 7	2.70	72
26	2.90	78

Daily discharge, in second-feet, of State canal near Redmond, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	May.	June.	July.	Aug.	Sept.
1915.					
1	......	71	......	......	......
2	......	72	......	......	81
3	......	81	......	......	100
4	......	88	......	......	107
5	......	91	......	......	102
6	......	107	......	99	43
7	......	107	......	97	......
8	......	......	......	98	......
9	......	......	......	92	......
10	......	......	88	104	......
11	......	......	85	96	......
12	......	......	91	85	29
13	......	......	85	30	119
14	......	......	94	......	104
15	......	......	98	......	102
16	......	......	96	......	91
17	56	......	96	......	63
18	64	......	101	......	41
19	62	......	106	38	......
20	65	66	......	84	......
21	66	75	......	78	......
22	......	74	......	54	......
23	......	74	......	48	......
24	......	91	......	64	......
25	......	84	......	83	......
26	......	84	......	61	7
27	......	84	......	......	44
28	......	......	......	......	55
29	......	......	......	......	8
30	......	......	......	......	4
31	......	......	......	......	......

Daily discharge, in second-feet, of State canal near Redmond, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1		24	68				16		51				
2		42	5.5				17		60		42		
3		48					18		63				
4		62					19		32				
5		58				20	20			36			
6		35		9.5	82	121	21			55			84
7				74	78	133	22			63	66	81	124
8				72	92	132	23			64	79	70	122
9				72	6	76	24			66	80	74	83
10			42	72	16	30	25			64	80	68	32
11				76	78	22	26			64	81	82	24
12				66	80	6	27		33	64	82	66	27
13					53		28	3.5	5		58		8.5
14		21					29	9.5	35				.5
15		54					30	6.5	70				1.0
							31		72				

NOTE.—No flow for periods of missing discharge.

Monthly discharge of State canal near Redmond, Utah, for the years ending Sept. 30, 1915 and 1916.

Month	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
May 17-31	66	0	20.9	621
June	107	0	41.6	2,480
July	106	0	30.3	1,860
August	104	0	39.1	2,400
September	119	0	36.7	2,180
1916.				
April 28-30	9.5	3.5	6.50	38
May	72	0	24.7	1,520
June	68	0	19.7	1,170
July	82	0	32.6	2,000
August	92	0	29.9	1,840
September	133	0	34.9	2,080

JOSEPH CANAL NEAR JOSEPH, UTAH.

LOCATION.—In SE. ¼ sec. 22, T. 25 S., R. 4 W., 100 yards below head of canal, about 1½ miles south of Joseph, Sevier County, on road to Marysvale.

RECORDS AVAILABLE.—April 6, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder, with outside and inside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Gravel section. Concrete weir 20 feet below gage serves as permanent control.

DIVERSIONS.—Above all diversions.

REGULATION.—Flow controlled by diversion weir and head gates of Sevier Valley canal.

ACCURACY.—Stage-discharge relation changing during 1915; permanent during 1916. Shifting in 1915 probably caused by sediment washing in and out above crest of control. Backwater during periods indicated in footnote to table of daily discharge caused by a check below control used to force water into a small lateral. Two rating curves used for 1915; one well defined curve for 1916. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records for 1915 good; for 1916, excellent.

Canal diverts water from right bank of Sevier Valley canal in the SE. ¼ sec. 22, T. 25 S., R. 4 W. Water used for irrigation in and near Joseph.

Discharge measurements of Joseph canal near Joseph, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Mar. 5	0.26	1.4	Sept. 17	0.94	17.4	May 16	1.68	47.2
Apr. 24	1.48	31.7				16	1.68	47.7
25	1.46	35.2	1916.			16	1.52	38.4
May 14	1.76	46.8	Mar. 8	.70	10.1	29	1.68	47.1
June 9	1.52	37.6	11	.65	8.7	June 10	2.13	66
28	1.50	39.3	Apr. 25	1.83	53	July 6	1.42	37.9
28	1.50	38.4	25	1.47	38.3	Aug. 15	.44	5
July 6	1.50	39.8	25	.55	7.1	Sept. 15	1.18	26.7
6	1.50	38.4	25	.90	18.2	19	.80	13.9
23	1.44	35.7	25	.96	21.3	19	1.08	23.1
Aug. 21	1.18	22.3	25	1.30	32			

Daily discharge, in second-feet, of Joseph canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	12	9	12	17	12
2	12	10	12	18	12
3	12	11	12	19	12
4	12	12	12	20	12
5	12	13	12	21	12
6	12	14	12	22	12
7	12	15	12	23	12
8	12	16	12	24	12

Day	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915								
1	....	0	37	39	36	32	18	18
2	....	0	36	40	34	32	20	18
3	....	0	35	40	37	31	22	17
4	....	0	36	39	41	31	21	21
5	1.4	0	37	39	41	31	21	31
6	1.6	0	40	38	39	32	21	31
7	1.8	0	40	36	39	32	21	33
8	2.0	0	39	36	38	33	21	33
9	2.2	2.1	37	41	37	32	21	30
10	2.8	6.3	30	48	36	31	21	21
11	2.9	6.5	21	45	35	31	20	22
12	2.4	13	19	45	36	33	17	20
13	3.4	20	42	42	37	33	17	....
14	3.4	20	47	39	38	33	18	....
15	3.5	20	45	39	38	32	18	....
16	3.5	22	40	39	38	33	19	....
17	3.2	22	42	40	39	34	18	....
18	2.4	28	41	42	35	33	18	....
19	2.9	32	41	40	33	32	18	....
20	3.5	32	41	40	34	32	18	....
21	3.5	33	40	39	35	29	18	....
22	4.9	33	39	39	37	25	18	....
23	8.0	32	36	39	37	22	18	....
24	8.2	32	37	39	36	19	18	....
25	8.0	35	39	39	36	19	18	....
26	6.9	35	42	39	37	18	18	....
27	6.9	35	40	38	38	18	18	....
28	8.0	36	37	38	37	19	18	....
29	5.4	36	38	37	36	19	18	....
30	0	37	37	37	33	19	18	....
31	0	....	38	....	33	17	....	....

Daily discharge, in second-feet, of Joseph canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	3	48	46	47	35	33	16	50	44	45	34	23	34
2	4	51	39	42	39	30	17	47	40	40	33	38	32
3	4	25	34	39	39	29	18	42	41	42	32	37	31
4	5	29	32	38	40	28	19	38	40	50	33	37	30
5	6	49	38	38	40	27	20	34	40	50	34	34	33
6	4	50	43	38	43	28	21	32	42	52	32	8	29
7	0	54	45	38	43	28	22	38	42	54	30	12	28
8	0	52	43	40	43	27	23	41	40	54	30	34	32
9	0	52	52	43	45	25	24	42	39	51	30	47	35
10	0	53	62	37	45	27	25	48	40	44	31	46	33
11	0	54	62	34	46	26	26	52	33	42	31	38	31
12	2	54	54	34	47	28	27	51	36	43	31	32	29
13	12	54	42	33	48	28	28	50	37	44	31	34	28
14	27	50	44	34	21	28	29	50	45	46	33	33	28
15	44	48	46	34	5	28	30	48	43	46	33	36	26
							31	......	44	......	33	36	......

NOTE.—Daily discharge estimated, because of backwater from below control Apr. 22–24, 29–30, May 18–19, June 1–2, July 11–13, 19–21, Aug. 4–6, 13–14, 20–22, 28–29, Sept. 5–7, 13–14, 1915.

Monthly discharge of Joseph canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914			1915.		
October 1-24	12.0	571	October 1-12	24.6	585
1915.			1916.		
March 5-31	3.8	203	April	25.8	1,540
April	19.0	1,130	May	44.1	2,710
May	37.7	2,320	June	46.4	2,760
June	39.7	2,360	July	34.8	2,140
July	36.6	2,250	August	35.6	2,190
August	28.0	1,720	September	29.3	1,740
September	18.9	1,120			

WELLS CANAL NEAR JOSEPH, UTAH.

LOCATION.—In the SW. ¼ sec. 23, T. 25 S., R. 4 W., three-quarters of mile below head of canal and 2 miles by wagon road south of Joseph, Sevier County.

RECORDS AVAILABLE.—April 7, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made from bridge across flume 20 feet above gage.

CHANNEL AND CONTROL.—Wooden flume about 4½ feet wide. Permanent control is afforded by plank across flume 10 feet below gage.

DIVERSIONS.—None above station.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation permanent. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Canal diverts water from right bank of Sevier River in the NE. ¼ sec. 27, T. 25 S., R. 4 W. Water is used for irrigation near Joseph.

Discharge measurements of Wells canal near Joseph, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 14	J. J. Sanford	1.64	18.9	Mar. 9	J. J. Sanford	0.78	3.8
June 9	do	1.61	19.5	Apr. 25	do	1.53	18.7
12	do	1.62	19.7	May 16	do	2.11	35.8
28	do	1.70	21.3	29	do	1.84	24.5
July 7	do	1.79	22.7	June 5	do	1.65	20.0
13	Porter and Sanford	1.70	21.8	5	do	1.45	15.2
Aug. 5	J. J. Sanford	1.38	14.3	23	do	1.60	19.0
21	do	1.20	10.5	July 6	do	1.34	13.5
				Aug. 15	do	1.44	16.6
				Sept. 16	do	1.35	10.4

Daily discharge, in second-feet, of Wells canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	6	11	7	21	8
2	6	12	7	22	8
3	7	13	7	23	8
4	7	14	7	24	8
5	6	15	7		
6	7	16	7		
7	7	17	7		
8	7	18	8		
9	7	19	8		
10	7	20	8		

Day.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
1915.								
1		0.5	19	19	22	15	7.4	6.9
2		.5	19	21	21	14	7.4	6.5
3		4.9	19	20	21	14	7.7	6.4
4		.7	19	20	21	14	7.7	4.1
5		7.6	20	19	23	14	7.5	4.5
6		9.1	20	19	23	15	7.5	4.5
7		8.6	19	18	23	15	7.5	4.3
8		8.7	19	18	22	15	7.7	4.3
9		8.2	19	19	22	15	7.7	4.5
10		7.4	18	20	22	15	7.5	6.7
11		7.9	18	20	27	15	7.7	8.0
12		6.5	18	20	31	14	8.2	8.4
13		9.2	18	19	25	14	7.7	
14		15	19	19	21	14	7.4	
15		21	19	17	21	14	9.1	
16		21	19	17	21	14	8.7	
17		21	19	17	20	14	8.2	
18		19	20	20	17	14	8.2	
19		20	21	21	14	14	8.0	
20	0.2	22	20	21	14	14	7.7	
21	.5	22	20	21	14	10	7.5	
22	.8	22	20	20	14	6.4	7.4	
23	1.2	22	19	21	15	6.2	7.2	
24	1.6	23	18	21	15	6.4	6.9	
25	1.6	23	19	21	15	6.4	6.9	
26	1.6	23	19	21	15	6.5	6.9	
27	1.6	21	18	21	15	7.2	6.9	
28	1.6	19	12	22	15	7.0	6.9	
29	1.3	19	17	22	15	7.0	6.9	
30	2.0	19	17	22	15	7.0	6.9	
31	1.2		18		15	7.5		

Daily discharge, in second-feet, of Wells canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.						
1	2.5	5.5	27.5	15.5	14.5	16.0
2	2.5	15.0	23.5	14.5	15.0	15.5
3	1.5	23.0	17.5	14.0	15.0	15.5
4	1.0	25.0	14.0	14.0	15.0	13.5
5	1.0	30.0	18.5	14.5	15.0	12.0
6	1.5	30.0	19.0	14.0	15.5	12.0
7	2.0	30.5	19.0	13.0	15.5	12.0
8	2.0	31.5	18.0	14.0	15.5	12.5
9	2.5	33.0	18.5	13.0	15.5	12.5
10	2.0	34.0	20.0	12.5	15.5	12.5
11	1.0	34.0	19.0	12.0	15.5	12.5
12	6.0	34.0	16.5	11.5	16.5	12.5
13	16.5	33.0	20.5	12.0	17.0	13.0
14	17.0	32.0	29.0	12.0	15.5	12.5
15	17.5	34.5	23.5	12.0	16.0	12.5
16	16.5	34.5	17.5	11.5	16.0	14.0
17	16.5	34.0	18.5	16.5	16.0	13.5
18	16.5	33.5	17.5	17.5	16.5	13.5
19	16.5	32.5	19.0	14.0	15.5	13.5
20	16.0	31.5	19.0	14.0	14.5	14.0
21	16.0	30.0	21.0	14.0	15.0	14.0
22	16.5	29.5	20.0	14.0	16.0	13.5
23	16.5	30.5	19.0	14.0	14.0	13.5
24	16.5	30.5	19.0	14.0	13.5	13.0
25	19.0	30.5	17.5	14.0	13.5	13.0
26	22.0	27.0	16.5	15.0	13.5	13.0
27	21.0	25.0	18.0	17.0	13.5	12.5
28	21.0	24.5	18.0	16.0	14.0	12.5
29	20.5	24.5	17.5	14.5	16.0	12.5
30	14.0	26.0	16.5	14.5	17.5	12.0
31	......	27.0	......	14.5	17.5	......

Monthly discharge of Wells canal near Joseph, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.		
October 1-24	7.2	341
1915.		
March 20-31	1.3	30
April	14.4	857
May	18.7	1,150
June	19.9	1,180
July	19.2	1,180
August	11.8	726
September	7.6	450
1915.		
October 1-12	5.8	137
1916.		
April	11.4	678
May	28.9	1,780
June	19.3	1,150
July	14.0	860
August	15.3	940
September	13.2	786

MONROE CANAL NEAR ELSINORE, UTAH.

Location.—In SW. ¼ sec. 6, T. 25 S., R. 3 W., 1 mile below head of canal and 3½ miles southwest of Elsinore, Sevier County.

Records available.—April 4, 1914, to September 30, 1916; irrigation seasons only.

Gage.—Stevens water-stage recorder on left bank, with inside and outside staff gages.

Discharge measurements.—Made by wading.

Channel and control.—One channel at all stages. Bed composed of gravel. Concrete weir with 18-inch flashboards, 15 feet below gage, serves as control.

Diversions.—Not known.

Regulation.—Flow controlled by head gates and flashboards on weir.

Accuracy.—Stage-discharge relation changed slightly at times during 1915 by accumulation of silt behind crest of control; permanent during season of 1916. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph; shifting-control method used for short periods in 1915. Records excellent.

Canal diverts water from right bank of Sevier River in the NW. ¼ sec. 12, T. 25 S., R. 4 W. Water used for irrigation in and near Monroe.

Discharge measurements of Monroe canal near Elsinore, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Mar. 9	J. J. Sanford	0.36	6.4	Mar. 11	J. J. Sanford	0.55	11.1
Apr. 24	.....do	1.37	57	Apr. 24	.....do	1.57	74
May 8	.....do	1.42	59	24	.....do	1.11	43.7
June 10	Sanford and Jones	1.40	57	24	.....do	.67	16.1
12	.....do	1.48	66	24	.....do	.87	29.3
25	J. J. Sanford	1.50	71	24	.....do	1.31	57
July 7	Sanford and Jones	1.56	74	May 29	.....do	1.62	80
22	J. J. Sanford	1.42	63	June 21	.....do	1.50	72
Aug. 21	Sanford and Jones	1.07	39.3	July 3	.....do	1.42	64
Sept. 18	J. J. Sanford	1.10	40.7	Aug. 5	.....do	1.58	76
Oct. 12	.....do	.88	27.0	Sept. 16	.....do	1.56	76

Daily discharge, in second-feet, of Monroe canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	48	11	26	21	25
2	48	12	25	22	25
3	48	13	25	23	24
4	48	14	25		
5	48	15	25		
6	48	16	25		
7	41	17	25		
8	26	18	25		
9	26	19	25		
10	26	20	25		

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	54	58	58	70	66	42	41
2	....	54	57	58	70	65	42	40
3	....	55	56	58	71	65	42	40
4	....	57	58	57	72	64	44	37
5	....	61	58	55	73	64	43	36
6	....	61	57	57	74	64	43	36
7	....	58	56	55	74	63	43	36
8	....	55	58	50	74	63	42	36
9	6.3	55	57	55	73	64	42	30
10	6.6	54	58	57	73	62	42	25
11	6.6	53	58	61	73	61	42	26
12	6.6	54	58	69	73	62	43	28
13	6.6	55	57	68	72	62	43	....
14	6.6	58	55	68	64	62	44	....
15	6.6	57	55	67	65	62	43	....
16	4.0	54	56	67	64	64	42	....
17	6.7	56	56	68	64	64	42	....
18	16	59	56	67	64	63	42	....
19	18	58	61	68	64	60	42	....
20	18	60	65	70	64	60	41	....
21	20	62	67	70	64	52	41	....
22	20	60	65	71	64	40	41	....
23	18	61	65	71	64	40	40	....
24	18	63	64	70	65	41	40	....
25	18	63	65	70	65	41	40	....
26	18	62	64	70	66	40	40	....
27	18	59	62	71	66	40	40	....
28	18	55	59	71	65	40	40	....
29	18	56	59	71	65	42	40	....
30	18	57	56	70	66	41	41	....
31	34	....	56	....	66	42	....	....

Daily discharge, in second-feet, of Monroe canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	0	83	81	68	76	67	16	68	92	73	66	78	74
2	0	84	67	64	76	51	17	66	90	67	64	76	74
3	0	75	76	64	76	78	18	38	31	66	62	76	74
4	0	88	68	66	76	78	19	40	50	68	62	76	73
5	0	96	61	66	78	78	20	79	90	70	64	78	75
6	0	96	72	66	79	78	21	77	84	70	66	78	75
7	0	98	72	61	78	68	22	78	84	71	68	78	75
8	3	58	71	67	78	61	23	76	89	71	72	72	74
9	5	82	74	68	78	62	24	74	92	71	72	68	72
10	6	92	76	68	76	61	25	85	90	70	73	68	71
11	7	91	72	66	76	67	26	86	82	70	71	68	70
12	7	90	68	66	78	74	27	88	80	70	76	68	68
13	32	91	73	66	78	74	28	88	82	70	75	68	66
14	56	92	88	66	78	73	29	86	80	68	72	68	64
15	62	92	80	66	78	72	30	85	78	68	72	68	62
							31	......	80	......	76	68	......

NOTE.—Gage height Mar. 24 to Apr. 1 unreliable; crest board on control tampered with; discharge estimated.

Monthly discharge of Monroe canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1915.		
October 1-23	31.8	1,450	September	41.7	2,480
			October 1-12	34.2	814
1915.					
March 9-31	14.2	647	1916.		
April	57.5	3,420	April	43.1	2,560
May	59.1	3,630	May	83.1	5,110
June	64.6	3,840	June	71.4	4,250
July	68.0	4,180	July	68.0	4,180
August	55.5	3,410	August	74.7	4,590
			September	70.3	4,180

ELSINORE CANAL NEAR ELSINORE, UTAH.

LOCATION.—In NW. ¼ sec. 6, T. 25 S., R. 3 W., about 300 yards below head of canal and 2½ miles southwest of Elsinore, Sevier County.

RECORDS AVAILABLE.—April 11, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed composed of gravel. Concrete weir 10 feet below gage serves as control.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation changed slightly during 1915 by sand accumulating above control; permanent during 1916. Rating curves well defined. Operation of water-stage recorder satisfactory throughout each season. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph; shifting-control method used for short periods in 1916. Records for 1915 good; for 1916 excellent.

Canal diverts water from left bank of Sevier River just above the Denver & Rio Grande Railroad bridge over the river south of Elsinore, in the NW. ¼ sec. 6, T. 25 S., R. 3 W.. Water used for irrigation in and near Elsinore.

Discharge measurements of Elsinore canal near Elsinore, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Mar. 8	0.58	0.9	Aug. 21	1.23	15.3	Apr. 26	1.50	25.3
Apr. 23	1.72	32.8	Sept. 18	1.26	15.0	May 29	1.36	21.2
May 8	1.53	25.0				July 3	1.60	28.4
June 10	1.78	34.0	1916.			Aug. 5	1.60	28.2
25	1.74	32.6	Mar. 7	.48	0.3	Sept. 15	1.45	20.5
July 7	1.74	33.4	Apr. 26	.95	7.1			
22	1.70	34.4	26	2.02	45.7			

Daily discharge, in second-feet, of Elsinore canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	0.6	32	33	33	37	15	19
2	....	.6	28	29	32	38	15	15
3	....	.8	26	27	33	38	15	16
4	....	6.3	26	28	34	35	15	11
5	....	14	26	25	35	33	15	9.1
6	....	16	26	24	31	33	15	8.8
7	....	19	25	24	33	32	15	8.5
8	1.0	23	25	23	32	31	15	8.0
9	1.1	23	24	26	32	31	15	7.8
10	1.2	27	26	32	31	31	15	13
11	1.2	31	29	32	30	32	15	14
12	1.4	29	31	32	30	31	15	....
13	1.4	29	33	31	31	31	15	....
14	1.5	29	34	31	31	31	15	....
15	1.4	28	36	30	31	31	15	....
16	1.4	28	37	34	30	33	15	....
17	1.2	29	36	37	30	33	15	....
18	.8	30	37	39	33	30	15	....
19	.6	32	28	36	32	30	15	....
20	.2	33	20	34	35	30	16	....
21	.5	32	20	34	35	24	16	....
22	1.1	32	20	28	34	17	15	....
23	2.1	32	19	25	36	18	16	....
25	1.9	32	21	31	40	19	15	....
25	.6	32	23	33	40	19	15	....
26	.6	32	23	32	39	19	15	....
27	.6	33	22	33	36	18	15	....
28	.6	33	26	33	34	17	16	....
29	.6	33	30	33	35	16	19	....
30	.6	34	31	33	38	16	19	....
31	.6	....	31	....	38	15	....	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	0.5	49	29	29	28	34	16	24	47	34	31	34	25
2	.5	48	27	30	28	35	17	25	46	34	28	32	25
3	.5	49	24	29	29	36	18	25	47	33	27	31	25
4	.5	48	28	31	29	35	19	23	45	35	27	31	25
5	.5	49	36	31	30	34	20	23	43	34	28	31	21
6	.5	49	41	32	32	33	21	23	43	36	27	33	17
7	.5	51	42	33	31	33	22	27	42	33	28	32	17
8	.5	51	43	35	31	37	23	30	43	23	28	31	16
9	.5	51	43	33	30	36	24	31	38	16	28	31	15
10	.5	48	44	32	29	34	25	39	32	16	28	32	15
11	.5	45	39	31	29	32	26	45	25	26	28	33	13
12	5	45	39	32	31	30	27	45	22	30	32	36	12
13	17	41	42	32	35	28	28	48	21	31	30	37	12
14	21	40	40	32	35	26	29	51	20	31	28	37	11
15	23	44	36	31	34	24	30	51	21	31	29	35	8
							31	......	26	......	28	35	......

NOTE.—No gage record, discharge interpolated, Sept. 9–14, 1916.

Monthly discharge of Elsinore canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Mean discharge in (second-feet).	Run-off (total in acre-feet).	Month.	Mean discharge in (second-feet).	Run-off (total in acre-feet).
1915.			1916.		
March 8-31	1.0	48	April	19.4	1,150
April	25.1	1,490	May	40.9	2,510
May	27.5	1,690	June	33.2	1,980
June	30.7	1,830	July	29.9	1,840
July	33.7	2,070	August	32.0	1,970
August	27.4	1,680	September	24.8	1,480
September	15.4	916			
October 1-11	11.8	258			

BROOKLYN CANAL NEAR ELSINORE, UTAH.

LOCATION.—In sec. 6, T. 25 S., R. 3 W., about a quarter of a mile below head of canal and 2½ miles southwest of Elsinore, Sevier County.

RECORDS AVAILABLE.—April 13, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder on left bank, with outside and inside staff gages.

DISCHARGE MEASUREMENTS.—Made from bridge 75 feet above gage.

CHANNEL AND CONTROL.—Bed composed of gravel. Concrete weir with flashboard 200 feet below gage serves as control.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation changed slightly several times during 1915 by accumulation of sand behind control crest; permanent during 1916. Rating curves well defined. Operation of water-stage recorder satisfactory throughout each season. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Canal diverts water from right bank of Sevier River near the Denver & Rio Grande Railroad bridge over the river south of Elsinore, in sec. 6, T. 25 S., R. 3 W. Water used for irrigation east of Elsinore.

Discharge measurements of Brooklyn canal near Elsinore, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1919.	*Feet.*	*Sec.-ft.*
Mar. 9	1.17	4.1	Aug. 30	1.55	16.6	Apr. 26	2.92	75.0
Apr. 24	2.32	51				.....do	1.55	17.5
May 8	2.27	45.2	1916.			May 27	2.74	71.5
June 9	2.42	54	Mar. 7	1.18	5.2	June 21	2.26	46.8
25	2.28	47.6	Apr. 7	1.95	32.0	Aug. 5	2.14	38.7
July 7	2.34	48.2	24	2.43	53.0	Sept. 19	2.08	36.8
22	1.92	28.3						

Daily discharge, in second-feet, of Brooklyn canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	42	9	15	17	16
2	41	10	15	18	32
3	42	11	15	19	44
4	42	12	15	20	50
5	42	13	15	21	50
6	28	14	15	22	50
7	15	15	14	23	90
8	15	16	14		

Daily discharge, in second-feet, of Brooklyn canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Mar	Apr.	May	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	14	48	56	48	32	19	15
2	....	16	48	60	48	32	19	15
3	....	29	46	58	47	32	20	15
4	....	28	44	58	47	32	20	14
5	....	26	45	56	48	31	19	15
6	....	25	44	56	48	32	19	20
7	....	30	44	56	48	31	19	20
8	4.0	37	44	56	48	32	19	20
9	4.2	36	49	56	47	32	19	17
10	4.2	35	58	58	47	33	19	16
11	4 4	35	58	58	47	33	20	22
12	3.0	34	60	56	47	32	20	....
13	1.6	34	58	56	44	31	21	....
14	4.6	32	61	49	34	31	21	....
15	5.0	31	62	44	34	31	20	....
16	5.3	30	62	46	33	32	21	....
17	8.0	29	64	47	31	31	21	....
18	7.1	29	65	46	29	31	20	....
19	5.0	36	51	48	30	31	20	....
20	5.0	51	37	49	30	31	20	....
21	4.4	52	37	49	30	26	20	....
22	4.0	50	46	49	30	16	20	....
23	4.2	51	48	48	30	17	25	....
24	1.4	55	49	48	31	17	45	....
25	.7	59	51	48	31	16	46	....
26	.5	59	53	48	31	16	33	....
27	6.1	52	54	50	34	17	16	....
28	18.0	46	53	50	33	17	15	....
29	10.6	47	52	50	33	16	15	....
30	4.0	47	52	48	33	17	15	....
31	11.0	....	53	....	33	17	....	....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							
1	....	20	88	60	40	41	40
2	....	19	85	54	38	41	39
3	....	18	86	44	38	41	38
4	....	14	84	43	40	41	38
5	....	13	83	49	40	41	38
6	....	22	84	49	38	43	38
7	....	25	85	49	38	43	37
8	....	32	92	49	39	42	39
9	....	32	85	50	39	41	40
10	....	31	86	53	39	41	40
11	....	30	86	53	38	41	40
12	....	29	86	50	38	42	40
13	....	31	82	50	38	44	41
14	....	32	78	48	38	45	40
15	6	34	77	41	38	50	39
16	11	36	76	41	38	50	40
17	17	38	78	46	36	48	39
18	17	41	86	45	35	48	39
19	17	41	74	47	36	48	38
20	25	41	70	46	36	48	40
21	34	46	70	46	36	48	41
22	31	52	70	44	37	48	39
23	22	52	70	42	37	44	39
24	22	54	70	44	37	40	38
25	22	66	70	41	38	40	36
26	22	74	70	39	38	40	36
27	22	82	70	40	41	40	36
28	22	96	64	39	41	39	35
29	21	88	61	38	41	39	35
30	21	88	61	39	41	40	34
31	20	....	61	....	41	40	....

NOTE.—1915: ~~Stage-discharge relation~~ affected by backwater for part of the day, due to check below control employed to supply water to a small lateral, discharge estimated, Mar. 31, Apr. 12–13, May 3, 15, 26, June 8, 20, July 4, 15, 28, Aug. 6, 17, 31, Sept. 27.

Monthly discharge of Brooklyn canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1915.		
October 1-23	31.2	1,420	October 1-11	17.2	375
1915.			1916.		
March 8-31	5.3	251	March 15-31	20.9	705
April	37.8	2,250	April	42.5	2,530
May	51.5	3,170	May	76.9	4,730
June	51.9	3,090	June	46.0	2,740
July	38.2	2,350	July	38.3	2,360
August	26.6	1,640	August	43.1	2,650
September	21.5	1,280	September	38.4	2,280

RICHFIELD CANAL NEAR ELSINORE, UTAH.

Location.—In NE. ¼ sec. 6, T. 25 S., R. 3 W., 200 feet below head of canal and 2 miles southwest of Elsinore, Sevier County.

Records available.—April 11, 1914, to September 30, 1916; irrigation seasons only.

Gage.—Stevens water-stage recorder on right bank, with inside and outside staff gages.

Discharge measurements.—Made by wading 75 feet above gage.

Channel and control.—Bed composed of gravel and sand. Concrete weir, with removable flashboards, 10 feet below gage, served as control until May 10, 1916, when permanent crest was installed.

Diversions.—Above all diversions from canal.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation changed during 1915 season by accumulation of sand back of control crest and changing of flashboards on control. Dates of change in conditions are accurately known from discharge measurements, gage records, and information furnished by water master. Several rating curves used for 1915; two well-defined curves for 1916. Water-stage recorder operated satisfactorily. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records for 1915 good; for 1916 excellent.

Canal diverts water from left bank of Sevier River a short distance below the Denver & Rio Grande Railroad bridge south of Elsinore, in the NW. ¼ sec. 6, T. 25 S., R. 3 W. Water used for irrigation in Sevier Valley west of the river near Elsinore.

Discharge measurements of Richfield canal near Elsinore, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Mar. 8	1.30	[a] 0.6	July 22	2.36	92	Apr. 26	1.37	18.3
Apr. 23	1.86	111	Aug. 19	1.45	78	May 17	2.36	115
May 8	2.08	76	30	1.24	56	27	2.18	95
26	2.38	78	Sept. 18	1.40	70	June 21	2.34	104
27	2.43	106	Oct. 12	1.20	52	July 3	2.10	82
27	2.04	64				Aug. 5	2.19	95
27	1.56	20.6	1916.			Sept. 19	1.47	23.8
June 9	2.39	102	Mar. 7	.76	23.4	19	1.75	47.2
25	2.37	97	Apr. 26	2.30	108	19	2.00	74
July 8	2.55	116	26	2.17	87			
21	2.40	98	26	1.82	57			

[a] Estimated.

Daily discharge, in second-feet, of Richfield canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1914.		1914.		1914.	
1	35	9	43	17	20
2	31	10	35	18	20
3	47	11	33	19	18
4	52	12	31	20	18
5	43	13	29	21	17
6	41	14	26	22	17
7	43	15	21	23	20
8	44	16	20	24	23

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	34	108	111	104	92	60	57
2	....	60	107	111	101	91	60	56
3	....	90	....	94	98	93	74	50
4	....	69	....	74	97	90	80	30
5	....	59	....	16	119	84	74	28
6	....	55	....	77	115	85	72	23
7	....	46	....	77	115	85	70	23
8	0.6	46	76	78	113	....	68	24
9	.6	92	30	99	106	....	69	30
10	.6	102	....	111	106	....	68	62
11	.6	99	....	112	107	....	68	57
12	.6	93	....	104	107	....	74	54
13	....	110	....	97	100	....	74	....
14	....	102	....	89	91	....	74	....
15	....	93	....	88	90	....	74	....
16	....	94	16	98	89	81	71	....
17	....	91	74	100	88	78	70	....
18	....	88	87	99	89	74	70	....
19	....	97	100	108	92	75	70	....
20	12	116	80	111	94	72	66	....
21	22	116	88	113	96	68	62	....
22	22	121	87	116	92	68	60	....
23	29	112	77	111	94	65	50	....
24	50	105	74	109	102	66	8	....
25	46	111	80	106	103	67	8	....
26	42	110	82	103	102	67	27	....
27	38	108	105	111	109	67	56	....
28	34	103	103	111	98	61	60	....
29	34	105	94	107	96	58	59	....
30	34	109	100	106	96	58	59	....
31	34	....	101	....	94	61	....	....

Daily discharge, in second-feet, of Richfield canal near Elsinore, Utah, for the year ending Sept. 30, 1915 and 1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							
1	....	....	106	106	81	99	86
2	....	....	102	106	85	95	85
3	....	....	106	104	90	98	79
4	....	....	106	93	95	100	81
5	....	....	106	121	99	96	75
6	....	....	107	121	91	101	71
7	23	....	110	121	91	81	67
8	18	....	118	126	106	80	80
9	10	....	126	130	100	75	87
10	8	2	130	134	95	72	86
11	8	12	131	113	88	72	82
12	8	29	147	102	90	75	81
13	8	48	144	88	88	79	84
14	8	67	122	85	90	73	79
15	8	87	116	98	91	80	71
16	8	93	117	98	86	87	79
17	8	99	116	104	80	81	80
18	9	60	121	104	72	85	78
19	16	46	113	106	75	93	74
20	12	81	111	106	80	88	92
21	10	96	107	108	80	99	94
22	....	99	106	104	81	96	90
23	....	102	100	101	83	90	86
24	....	102	83	104	84	84	78
25	....	101	75	104	86	83	73
26	....	107	70	94	91	80	71
27	....	81	82	95	104	80	70
28	....	112	84	95	101	79	67
29	....	112	106	93	98	78	65
30	....	113	106	88	100	86	66
31	....	....	105	....	100	88	....

NOTE.—1915: Daily discharge estimated Mar. 13–19, 0.6 second-foot; May 3–7, 85 second-feet; May 10–15, 1 second-foot; Aug. 8–15, 83 second-feet; and Mar. 20, 25–27, 30–31, Apr. 1–2, Sept. 6–7, as given in table. Canal head gates closed Mar. 8–19, May 10–15. 1916: No flow Mar. 22 to Apr. 9.

Monthly discharge of Richfield canal near Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.			1916.		
October 1–24	30.3	1,440	March 7–31	6.5	321
			April	55.0	3,270
1915.			May	109	6,700
March 8–31	16.8	800	June	105	6,250
April	91.2	5,430	July	89.7	5,520
May	67.7	4,160	August	85.6	5,260
June	98.2	5,840	September	78.6	4,680
July	100	6,150			
August	76.4	4,700			
September	61.8	3,680			
October 1–12	41.2	980			

ANNABELLA CANAL AT ELSINORE, UTAH.

LOCATION.—In NW. ¼ sec. 33, T. 24 S., R. 3 W., about 400 yards below head of canal and a mile southeast of Denver & Rio Grande Railroad station at Elsinore, Sevier County.

RECORDS AVAILABLE.—April 11, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder with outside and inside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading 150 feet below gage.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Concrete weir 10 feet below gage serves as control.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge practically permanent. Rating curve well defined. Operation of water-stage recorder satisfactory during irrigation seasons of both 1915 and 1916. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent.

Canal diverts water from right bank of Sevier River in the NW. ¼ sec. 33, T. 25 S., R. 3 W. Water is used for irrigation in Sevier Valley east of the river and below Elsinore.

Discharge measurements of Annabella canal at Elsinore, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Mar. 9	0.46	3.7	July 8	1.37	43.8	June 6	1.43	38.6
Apr. 25	1.36	44.5	21	1.08	26.0	6	1.44	39.6
May 8	1.36	43.9	Aug. 30	.72	11.6	21	1.16	31.1
June 10	1.31	40.5	Sept. 18	.82	14.6	July 3	.98	22.4
25	1.26	36.4				Aug. 4	1.04	26.0
27	1.15	29.8	1916.			15	.96	21.2
26	1.18	32.3	Mar. 9	.40	3.0	Sept. 19	.93	21.3
			Apr. 27	1.28	38.0			

Daily discharge, in second-feet, of Annabella canal at Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	October.	Day.	October.	Day.	October.
1914.		1914.		1914.	
1	15	9	15	17	13
2	15	10	15	18	13
3	14	11	15	19	13
4	14	12	13	20	13
5	14	13	13	21	13
6	14	14	13	22	13
7	14	15	13	23	11
8	14	16	13		

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	14	44	40	30	29	9	14
2	....	16	46	42	28	26	10	13
3	....	22	26	44	31	27	16	12
4	....	22	24	51	30	26	20	11
5	....	21	41	50	47	22	18	10
6	....	20	42	46	46	23	16	10
7	....	20	44	43	45	24	16	9
8	....	20	44	40	44	22	15	9
9	3.8	18	46	36	39	22	15	9
10	4.3	16	45	40	38	22	15	9
11	4.3	10	45	41	36	24	16	9
12	5.2	14	46	37	38	22	16	....
13	6.6	17	46	26	32	19	16	....
14	6.3	19	46	29	26	21	16	....
15	2.4	20	48	29	25	22	16	....
16	....	20	47	33	26	26	15	....
17	....	22	41	36	24	26	15	....
18	....	26	42	30	24	25	15	....
19	....	33	30	36	24	24	16	....
20	....	39	19	47	24	22	14	....
21	....	40	19	48	26	19	14	....
22	....	41	19	49	25	19	15	....
23	....	45	19	49	26	16	21	....
24	....	44	19	44	31	16	24	....
25	....	44	18	43	31	14	23	....
26	....	44	26	33	31	15	22	....
27	....	44	32	24	33	15	18	....
28	....	41	30	12	29	12	16	....
29	....	41	34	32	29	11	15	....
30	9.4	43	36	29	29	12	13	....
31	16.0	....	38	....	30	18	....	....

Daily discharge, in second feet, of Annabella canal at Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.						
1	0.5	44	34	18	28	24
2	.5	42	30	20	28	24
3	.5	44	16	22	26	21
4	.5	42	10	26	25	22
5	.5	43	18	28	26	20
6	4	45	32	24	26	18
7	10	50	37	24	24	17
8	9	56	35	30	24	22
9	22	52	39	28	24	26
10	28	56	52	30	24	26
11	26	59	56	26	24	26
12	26	57	52	26	25	22
13	22	54	52	25	26	24
14	22	56	35	26	25	22
15	24	56	22	26	23	21
16	24	54	30	24	24	22
17	24	43	23	20	24	22
18	25	50	5	18	24	22
19	26	42	26	18	24	21
20	25	30	31	19	22	22
21	22	30	31	20	24	24
22	24	28	30	22	20	24
23	25	28	28	21	20	18
24	27	32	29	20	20	14
25	32	34	30	20	18	14
26	36	26	30	22	16	16
27	39	14	32	8	18	18
28	38	18	30	4	17	18
29	41	16	26	22	17	18
30	42	26	22	25	20	17
31	......	39	......	26	22	......

NOTE.—1915: Clock of recording gage stopped, discharge estimated from range of stage recorded May 28 to June 3, June 7, 9, July 7, Aug. 31, Sept. 2–3, 7, 9–11, 26–29. No flow Mar. 16–29. 1916: No gage height record, discharge estimated, Apr. 15–19, July 19–21. Temporary change in control, discharge determined from parallel rating curve June 6–14.

Monthly discharge of Annabella canal at Elsinore, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1914.		
October 1–23	13.6	620
1915.		
March 9–31	2.5	115
April	27.9	1,660
May	35.6	2,190
June	38.0	2,260
July	31.5	1,940
August	20.7	1,270
1915.		
September	16.2	964
October 1–11	10.4	227
1916.		
April	21.5	1,280
May	40.8	2,510
June	30.7	1,830
July	22.1	1,360
August	22.9	1,410
September	20.9	1,240

VERMILION CANAL NEAR RICHFIELD, UTAH.

LOCATION.—In NW. ¼ sec. 32, T. 23 S., R. 2 W., 500 feet below head of canal and 2½ miles east of Richfield, Sevier County.

RECORDS AVAILABLE.—April 10, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder on right bank, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge a quarter of a mile below gage.

CHANNEL AND CONTROL.—Bed composed of sandy loam. Concrete weir 10 feet below gage serves as nominal control, but owing to the light grade of the canal, growth of moss and deposits of sand cause changes in the rating.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation changed frequently during season of 1915, but remained permanent during season of 1916. Several rather poorly defined rating curves used for 1915, well-defined curve used for 1916. Operation of water-stage recorder satisfactory throughout each season. Daily discharge ascertained by applying to rating table, either directly or by shifting-control method, the mean daily gage height determined by inspecting recorder graph. Records good.

Canal diverts water from left bank of Sevier River in the NW. ¼ sec. 32, T. 23 S., R. 4 W. Water used for irrigation in Sevier Valley west of the river and northeast of Richfield, toward Vermilion.

Discharge measurements of Vermilion canal near Richfield, Utah, during the years ending Sept. 30, 1915 and 1916.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1915.	*Feet.*	*Sec.-ft.*	1915.	*Feet.*	*Sec.-ft.*	1916.	*Feet.*	*Sec.-ft.*
Apr. 22	1.69	73	Aug. 14	2.05	73	June 6	1.87	87
May 7	1.53	69	30	1.63	55	21	1.52	60
June 10	1.83	84	Oct. 11	1.88	64	July 3	1.74	64
23	1.85	83				20	1.91	58
July 8	2.04	79	1916.			Aug. 4	2.26	62
8	2.04	83	Mar. 10	.06	1.0	14	2.20	64
8	2.04	86	27	.92	36.8	Sept. 7	2.02	68
20	1.84	67	May 1	1.68	73	19	1.60	53
21	1.87	67	13	2.00	93			
Aug. 4	2.17	81	25	1.83	82			

Daily discharge, in second-feet, of Vermilion canal near Richfield, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1		24	84	77	77	86	57	73
2		21	88	101	80	85	63	71
3		69	69	108	75	80	71	72
4		100	77	104	72	80	79	73
5		57	74	77	75	76	75	72
6		67	66	73	88	74	70	70
7		63	70	73	89	85	65	66
8		54	71	73	82	83	68	66
9		57	69	73	83	79	64	66
10		53	72	73	77	80	60	66
11		33	81	93	70	77	69	66
12		39	89	89	72	81	64	
13		42	92	83	68	76	66	
14		54	95	79	69	74	70	
15		58	96	80	67	72	74	
16		57	99	77	70	70	71	
17		55	94	83	70	80	70	
18		57	112	83	71	70	67	
19		58	119	78	64	64	66	
20		64	98	77	63	62	64	
21		79	86	84	67	68	62	
22		73	85	87	66	62	60	
23		69	81	85	63	59	61	
24	0	68	66	84	72	58	64	
25	0	71	65	68	77	57	67	
26	0	65	96	74	80	55	69	
27	0	59	105	74	86	56	62	
28	0	55	87	91	86	56	63	
29	0	50	75	84	82	56	66	
30	0	71	76	74	84	56	73	
31	13		83		85	58		

Daily discharge, in second-feet, of Vermilion canal near Richfield, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							
1	....	41	76	80	65	72	54
2	....	36	72	78	66	65	64
3	....	29	72	68	65	59	70
4	....	8	73	71	52	60	68
5	....	3	70	70	48	68	68
6	....	18	72	80	51	62	70
7	....	38	75	94	54	46	68
8	....	32	78	95	56	46	68
9	....	31	88	100	51	53	76
10	1	31	96	97	50	50	74
11	1	28	99	108	48	46	74
12	1	24	96	105	72	42	75
13	1	30	92	95	73	64	74
14	1	38	94	94	74	65	71
15	1	57	94	83	75	60	74
16	1	59	92	76	72	50	70
17	1	62	90	74	62	43	68
18	1	64	90	79	62	48	62
19	1	70	92	74	65	68	54
20	1	60	82	66	58	62	53
21	17	54	82	64	56	62	71
22	32	52	80	78	57	67	74
23	32	54	80	83	66	58	80
24	34	60	80	79	72	56	88
25	32	61	82	82	74	56	84
26	33	63	84	78	67	57	78
27	36	64	80	74	68	51	79
28	38	113	78	69	68	52	84
29	38	81	80	67	56	54	86
30	39	74	78	66	52	56	86
31	42	....	76	....	54	63	....

Monthly discharge of Vermilion canal near Richfield, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1915.			1916.		
March 24–31	1.6	26	March 10–31	17.5	764
April	58.1	3,460	April	47.8	2,840
May	84.5	5,200	May	83.0	5,100
June	82.0	4,880	June	80.9	4,810
July	75.2	4,620	July	61.6	3,780
August	70.2	4,320	August	56.8	3,490
September	66.7	3,970	September	72.2	4,300
October 1–11	69.2	1,510			

ROCKYFORD CANAL NEAR VERMILION, UTAH.

LOCATION.—In NE. ¼ sec. 19, T. 22 S., R. 1 W., at highway bridge about a quarter of a mile below head of canal and 2 miles northeast of Vermilion, Sevier County.

RECORDS AVAILABLE.—July 8, 1914, to September 30, 1916.

GAGE.—Vertical staff nailed to right bridge abutment; read by Earl Thalman and Mrs. Will Barron.

DISCHARGE MEASUREMENTS.—Made from highway bridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and clay; fairly permanent.

ICE.—Conditions not known.

DIVERSIONS.—Not known.

REGULATION.—Flow controlled by head gates.

Accuracy.—During 1915 stage-discharge relation changed several times; rating curves poorly defined; for 1916 one fairly well-defined curve used throughout season, except for a part of August and September, when changes in control occurred. Gage read daily to tenths during irrigation season and several times a week during remainder of year. Daily discharge ascertained by applying daily gage height to rating table, either directly or by shifting-control method. Records for 1915 fair; for 1916, good.

Canal diverts water from Rockyford reservoir, a small reservoir on Sevier River at Vermilion, in sec. 19, T. 22 S., R. 2 W. Flow dependent on water stored in reservoir and seepage and return waters below Richfield. Water used for irrigation north of Vermilion.

Discharge measurements of Rockyford canal near Vermilion, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Oct. 28	J. J. Sanford	2.00	44.4	Oct. 26	J. J. Sanford	1.72	47.6
				Dec. 14	A. B. Purton	1.56	39.8
1915.							
Mar. 24	.....do	1.66	35.2	1916.			
May 6	J. C. Dort	2.48	70	Jan. 22	J. J. Sanford	1.42	34.3
7	J. J. Sanford	2.47	70	Mar. 6	.....do	2.12	67
June 1	J. C. Dort	2.58	73	28	.....do	1.80	48.8
11	J. J. Sanford	2.28	75	Apr. 10	.....do	2.20	68
23	.....do	2.51	87	May 15	.....do	2.47	83
July 9	.....do	2.54	81	25	.....do	2.47	85
20	.....do	2.68	92	June 9	.....do	2.72	94
Aug. 14	.....do	2.48	84	July 7	.....do	2.54	86
23	J. C. Dort	2.54	88	Aug. 14	.....do	2.28	82
Sept. 4	J. J. Sanford	2.74	88	Sept. 9	.....do	2.76	88

Daily discharge, in second-feet, of Rockyford canal near Vermilion, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	39	44	25	17	......	12	59	92	74	83	91	79
2	39	44	23	17	......	15	54	90	74	83	92	78
3	40	43	23	17	......	15	56	85	78	83	93	83
4	42	41	23	17	......	15	56	85	78	83	93	89
5	44	41	23	17	......	15	70	70	78	83	92	90
6	44	41	23	17	......	15	69	70	78	83	91	88
7	44	41	23	17	......	15	64	68	78	81	91	85
8	44	41	23	9	......	15	63	69	0	80	91	83
9	45	41	23	......	......	15	64	69	0	79	90	83
10	45	40	22	......	......	25	56	69	0	79	86	83
11	45	25	22	......	......	38	54	70	40	78	86	83
12	44	......	22	......	......	38	52	74	87	78	86	83
13	44	......	22	......	......	38	51	75	87	79	86	83
14	44	......	22	......	......	38	50	75	88	79	86	83
15	44	......	22	......	......	38	50	75	88	79	86	86
16	44	......	21	......	......	38	51	75	88	79	86	87
17	44	......	21	......	4	38	51	75	88	102	86	78
18	44	......	22	......	9	38	50	74	88	100	86	88
19	44	......	21	......	9	38	50	75	88	98	86	67
20	44	......	21	......	9	38	82	75	88	98	86	71
21	43	......	18	......	9	36	75	76	87	99	86	71
22	44	......	15	......	9	35	68	78	86	99	86	66
23	44	......	17	......	9	35	68	78	86	91	87	66
24	44	14	17	......	9	34	71	78	86	87	86	61
25	44	32	17	......	10	52	73	77	86	87	86	61
26	44	32	16	......	9	52	84	77	87	87	83	61
27	44	32	17	......	9	52	84	76	86	89	82	61
28	44	32	17	......	9	52	83	75	85	90	81	61
29	44	33	17	......	......	64	83	74	85	90	76	59
30	44	33	16	......	......	65	85	74	85	91	80	59
31	44	......	16	......	......	61	......	74	......	91	80	......

Daily discharge, in second-feet, of Rockyford canal near Vermilion, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.												
1	53	43	40	35	26	52	49	96	40	90	70	69
2	53	44	39	38	26	52	49	96	79	90	70	68
3	54	45	39	38	26	55	50	96	79	90	70	68
4	53	47	40	38	27	58	50	96	96	90	70	66
5	55	49	40	37	27	62	45	85	96	90	70	66
6	54	50	39	38	28	66	40	79	96	90	70	65
7	53	52	39	37	27	61	52	79	96	90	71	77
8	55	54	39	35	29	56	69	85	96	90	71	85
9	56	54	40	36	31	51	69	90	96	90	72	74
10	56	54	40	37	30	52	69	90	96	90	85	64
11	55	54	40	36	28	54	69	90	74	90	100	64
12	55	53	40	34	27	54	69	90	74	91	100	64
13	41	44	40	34	26	54	69	90	74	91	83	64
14	40	43	40	35	25	54	69	90	74	91	83	64
15	43	43	39	34	26	54	64	88	74	91	82	65
16	43	43	38	35	26	54	64	85	74	92	81	65
17	45	43	38	35	34	54	64	85	74	92	72	66
18	49	42	37	35	42	54	64	85	90	92	64	66
19	53	42	33	34	49	54	64	85	90	92	54	66
20	50	43	34	35	49	52	64	85	90	93	53	66
21	53	43	35	36	48	50	62	85	90	93	52	66
22	54	42	36	35	48	47	59	79	90	94	51	66
23	54	42	37	34	48	47	74	79	90	94	51	67
24	51	42	37	35	48	47	90	79	90	100	50	67
25	46	40	37	36	48	47	90	79	90	100	50	68
26	46	40	37	36	48	47	90	79	90	95	73	68
27	45	40	37	37	49	48	90	79	90	95	73	68
28	43	39	35	31	50	48	90	79	90	95	72	68
29	43	39	35	28	51	48	90	85	90	95	71	68
30	43	40	33	29	......	48	90	20	90	69	70	45
31	43	......	35	26	......	48	......	0	......	69	69	......

NOTE.—1914-15: Water surface below gage, discharge estimated, Nov. 12–23 and Jan. 9–31, 2 second-feet; Feb. 1–16, 3 second-feet. No gage-height record, discharge estimated, Jan. 6–8, Feb. 17, Mar. 22–23. 1915–16: No gage-height record, discharge interpolated, Nov. 17–18, 22, 27, 30, Dec. 11, Jan. 4, 11, 25, Feb. 1, 8, 12–13, 15, 17–18, 20–21, 23–24, 26, 28–29, Mar. 1, 3–5, 7–8, 10, 13–14, 16–17, 20–21, 23–24, 26–27, 29–30, Apr. 1–3. Estimated May 30 to June 1.

Monthly discharge of Rockyford canal near Vermilion, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914–15.				
October	45	39	43.5	2,670
November	44	2	22.5	1,340
December	25	15	20.3	1,250
January	17	2	5.6	345
February	10	....	5.4	302
March	65	12	34.7	2,130
April	85	50	64.2	3,820
May	92	68	75.7	4,650
June	88	0	74.2	4,420
July	102	78	86.7	5,330
August	93	76	86.5	5,320
September	90	59	75.9	4,520
The year	102	0	49.9	36,100
1915–16.				
October	56	40	49.6	3,050
November	54	39	45.0	2,680
December	40	33	37.7	2,320
January	38	26	34.8	2,140
February	51	26	36.1	2,080
March	66	47	52.5	3,230
April	90	40	67.6	4,020
May	96	0	80.9	4,970
June	90	40	85.3	5,080
July	100	69	90.8	5,580
August	100	50	70.1	4,310
September	85	45	66.8	3,970
The year	100	0	59.8	43,400

SALINA CREEK AT SALINA, UTAH.

LOCATION.—In NW. ¼ sec. 25, T. 21 S., R. 1 W., at bridge south of hotel at Salina, Sevier County, about a mile above mouth of creek.

DRAINAGE AREA.—298 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 25, 1914, to September 30, 1916. July 1 to December 31, 1900, at vertical staff gage about 5 miles southeast of Salina.

GAGE.—March 23, 1915, to September 30, 1916, vertical staff gage nailed to right bridge abutment a quarter of a mile south of hotel; April 25, 1914, to March 22, 1915, vertical staff nailed to right abutment of bridge on depot road in SE. ¼ sec. 23. Gage reader, Deane Steele.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; shifts during extreme high water.

EXTREMES OF DISCHARGE.—1914–1916: Maximum stage recorded, 5.20 feet May 22, 1914 (discharge, 270 second-feet); no flow at times.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Below all diversions.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed frequently. Owing to unreliability of gage-height record and instability of control, determination of daily discharge not made for this station; record of monthly discharge for 1916 roughly approximate only. Stream practically dry at mouth from about the middle of June to September, except for sudden floods caused by local rainstorms.

Discharge measurements of Salina Creek at Salina, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 14	A. B. Purton	1.08	7.3	Apr. 28	J. J. Sanford	1.82	52
Jan. 22	J. J. Sanford	3.00	21.5	May 15	do	1.00	14.5
Feb. 18	do	1.24	14.4	June 19	do	.59	1.3
Mar. 10	do	1.52	30.2	July 6	do	.59	1.2
28	do	1.46	30.1	7	do	.58	1.2
Apr. 13	E. A. Porter	.79	.8	Aug. 14	do	.42	.4
18	J. J. Sanford	1.08	6.5	Sept. 9	do	1.24	52

Monthly discharge of Salina Creek at Salina, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	1.5	0.2	0.4	20
November	24.0	.3	6.5	390
December			[a] 10.4	640
January			[a] 18.0	1,110
February			[a] 14.0	800
March	76	9.7	25.9	1,590
April	72	1.5	10.9	650
May	135	22	64.6	3,970
June	50	.7	6.6	390
July	56	1.4	6.0	370
August	300	0	9.4	580
September			6.6	390
The year				10,900

[a] Estimated; stage-discharge relation affected by ice.

WEST VIEW CANAL AT REDMOND, UTAH.

Location.—In NW. ¼ sec. 7, T. 21 S., R. 1 E., about 100 yards above bridge, where depot road crosses canal, at southeast corner of Redmond, Sevier County, about three-quarters of a mile below head of canal.

Records available.—April 22, 1914, to September 30, 1916, during irrigation season only.

Gage.—Stevens water-stage recorder on right bank, with inside and outside staff gages.

Discharge measurements.—Made by wading just below gage.

Channel and control.—Earth section; wooden submerged weir at head of wooden flume 30 feet below gage acts as nominal control, though filling in of sand behind the weir causes changes in stage-discharge relation.

Diversions.—Not known.

Regulation.—Flow controlled by head gates

Accuracy.—Stage-discharge relation changed several times during seasons of 1915 and 1916, due to manipulation of weir crest and filling in of sand. Several rating curves poorly defined at lower stages. Water-stage recorder gave satisfactory gage-height record throughout each irrigation season. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph, except for days of considerable variation, for which the means of hourly discharge were used. Records fair.

Canal diverts water from left bank of Sevier River in the SW. ¼ sec. 7, T. 21 S., R. 1 E. Water is used for irrigation west of river and below Redmond.

Discharge measurements of West View canal at Redmond, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Mar. 5	L. W. Jordan	4.66	13.7	Apr. 2	E. A. Porter	5.17	21.4
22	J. J. Sanford	5.36	29.6	18	Sanford and Jacob	5.56	27.8
Apr. 24	J. C. Dort	5.39	27.2	May 12	E. A. Porter	5.68	31.2
May 6	.....do	5.58	31.3	27	.....do	5.49	28.2
June 2	.....do	5.59	31.2	June 3	.....do	5.35	25.4
28	.....do	5.22	25.3	10	.....do	5.14	20.0
28	.....do	4.54	12.3	27	.....do	4.88	12.5
July 8	.....do	4.36	7.8	July 15	.....do	5.12	17.8
28	.....do	4.39	8.4	19	.....do	5.26	22.3
Aug. 2	.....do	4.49	10.7	Aug. 17	.....do	5.58	29.0
16	.....do	4.36	8.7	28	.....do	5.25	23.0
30	.....do	4.34	8.2	Sept. 10	.....do	5.21	22.6
Sept. 13	.....do	4.43	10.2	18	J. J. Sanford	5.26	24.2
Oct. 5	L. W. Jordan	4.55	11.3				

Daily discharge, in second-feet, of West View canal at Redmond, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	32	30	11	14	7.4	8.3	11
2	....	30	31	26	14	11	8.3	22
3	....	30	32	30	11	12	9.2	28
4	....	8.5	31	32	14	13	8.5	19
5	16	4.7	31	27	12	14	7.7	12
6	21	0	31	28	13	16	7.9	....
7	20	2.1	30	27	9.0	15	8.3	....
9	17	0	30	34	7.2	14	9.2	....
9	17	14	29	32	9.8	14	9.0	....
10	21	25	27	20	12	12	9.8	....
11	24	20	27	25	13	12	11	....
12	27	21	29	24	16	12	10	....
13	27	21	32	25	17	9.4	9.6	....
14	27	19	29	14	15	7.6	9.8	....
15	28	20	27	11	18	0	10	....
16	30	23	28	22	19	.8	10	....
17	28	24	33	27	14	1.2	11	....
18	30	26	33	25	12	4.1	11	....
19	30	26	32	26	13	10	11	....
20	30	16	30	25	14	11	11	....
21	28	15	28	25	14	11	11	....
22	28	19	28	19	14	9.4	11	....
23	27	28	24	18	13	8.6	9.8	....
24	27	31	33	21	14	6.5	10	....
25	27	30	34	20	16	5.8	10	....
26	28	12	30	16	20	5.9	10	....
27	31	10	28	22	17	6.3	9.8	....
28	33	27	30	19	8.1	6.7	9.8	....
29	18	32	29	14	7.0	7.4	10	....
30	0	31	30	12	9.2	8.1	10	....
31	21	....	25	....	7.9	9.4	....	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	20	24	11	15	24	23	16	23	32	15	19	30	24
2	23	27	10	17	23	22	17	25	30	11	22	28	23
3	16	27	13	16	20	20	18	27	19	9	18	23	24
4	14	25	26	18	19	20	19	30	31	11	18	16	24
5	14	28	28	20	22	20	20	31	28	12	17	27	24
6	9	28	25	30	16	18	21	5	24	11	16	30	23
7	12	26	20	22	32	18	22	25	31	10	14	35	25
8	21	29	20	20	30	19	23	4	34	13	19	35	32
9	8	36	18	20	27	21	24	7	35	11	21	31	27
10	0	31	22	14	32	22	25	0	31	13	21	29	16
11	0	32	31	18	27	23	26	0	26	9	18	28	16
12	0	32	32	16	23	25	27	22	28	14	16	24	16
13	15	32	30	27	26	27	28	28	30	16	22	23	13
14	14	30	24	21	27	26	29	28	25	18	17	24	20
15	18	29	19	18	28	23	30	26	21	19	20	24	26
							31	......	12	......	24	23	......

Monthly discharge of West View canal at Redmond, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1915.			1916.		
March 5-31	24.5	1,310	April	15.5	920
April	19.9	1,180	May	28.2	1,730
May	30.0	1,840	June	17.4	1,030
June	22.6	1,340	July	19.2	1,180
July	13.1	810	August	26.0	1,600
August	9.1	560	September	22.0	1,310
September	9.7	580			
October 1-5	18.4	180			

FAYETTE CANAL NEAR CENTERFIELD, UTAH.

Location.—In SW. ¼ sec. 8, T. 20 S., R. 1 E., half a mile below head of canal, about 2 miles northwest of Axtel railroad station, and 4 miles south of Centerfield, Sanpete County.

Records available.—April 21, 1914, to September 30, 1916; irrigation seasons only.

Gage.—Stevens water-stage recorder on right bank, with inside and outside staff gages.

Discharge measurements.—Made by wading.

Channel and control.—Earth section. Wooden flume with crest board at upper end, 50 feet below gage, serves as control; changed at times during irrigation season.

Diversions.—Above all diversions from canal.

Regulation.—Flow controlled by head gates.

Accuracy.—Stage-discharge relation changed during irrigation seasons of 1915 and 1916 through interference with crest of control by irrigators and through backwater from diversion checks below. Four fairly well-defined rating curves used during these seasons. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records good.

Canal diverts water from right bank of Sevier River in the NE. ¼ sec. 18, T. 20 S., R. 1 E. Water is used for irrigation east of river near Centerfield.

Discharge measurements of Fayette canal near Centerfield, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Mar. 4	L. W. Jordan	1.22	5.5	Apr. 6	E. A. Porter	1.74	29.0
Apr. 24	J. C. Dort	2.00	44.4	13	do	2.30	24.9
May 11	do	2.20	52	24	do	2.38	28.8
27	do	2.35	62	25	do	2.19	31.2
June 1	do	2.60	74	May 12	do	2.78	65
2	do	2.11	51	27	do	2.50	50
16	do	1.50	18.8	June 3	do	2.76	64
28	do	1.61	24.7	10	do	2.07	24.9
July 8	Porter and Dort	1.45	16.7	25	do	1.93	17.6
27	J. C. Dort	1.52	21.5	July 13	do	1.97	19.5
Aug. 2	do	1.71	24.6	Aug. 7	J. W. Thurston	2.14	29.8
30	do	1.66	22.4	Sept. 19	E. A. Porter	2.11	29.5
Sept. 13	do	1.52	18.4	25	do	2.27	38.8
Oct. 5	L. W. Jordan	2.48	58				

Daily discharge, in second-feet, of Fayette canal near Centerfield, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	5.0	74	56	28	22	21	15
2	....	5.9	62	48	26	23	25	15
3	....	5.9	69	72	27	24	28	58
4	5.4	12	74	59	29	24	38	58
5	5.4	12	72	36	26	22	30	58
6	5.0	7.7	54	36	26	22	29	....
7	4.5	8.2	57	35	22	26	28	....
8	4.5	6.8	56	62	18	24	26	....
9	4.5	6.8	54	82	16	23	26	....
10	4.5	7.3	56	60	16	26	28	....
11	5.0	9.6	55	56	16	25	26	....
12	4.1	9.6	55	60	16	26	20	....
13	3.7	9.1	57	68	16	22	19	....
14	3.2	11	56	36	18	18	18	....
15	3.2	11	48	20	18	15	18	....
16	4.5	9.6	44	20	18	16	17	....
17	4.1	24	46	24	20	13	16	....
18	3.7	50	46	25	19	14	16	....
19	3.2	52	46	26	18	13	18	....
20	3.2	41	50	27	19	12	18	....
21	3.2	38	52	27	18	12	18	....
22	3.7	30	52	28	18	12	18	....
23	4.1	34	30	27	17	14	18	....
24	3.7	42	44	26	16	18	16	....
25	3.2	40	72	26	18	18	16	....
26	2.8	41	72	27	20	18	16	....
27	4.1	60	66	28	20	20	16	....
28	4.1	46	60	24	20	19	15	....
29	9.6	52	62	25	20	17	14	....
30	6.3	76	64	29	21	21	14	....
31	5.4	....	67	....	22	22	....	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	45	38	42	24	18	25	16	24	57	26	16	41	31
2	43	39	64	22	25	26	17	29	57	23	15	40	31
3	63	42	62	22	29	24	18	30	56	22	18	40	30
4	51	31	41	21	37	23	19	28	56	23	20	38	30
5	39	48	36	21	38	23	20	26	66	22	22	37	30
6	30	52	28	21	39	22	21	28	63	23	18	37	30
7	21	53	27	20	37	23	22	28	57	21	15	39	32
8	24	54	30	20	42	23	23	28	60	21	14	41	35
9	25	64	27	35	42	23	24	28	60	20	14	40	37
10	26	69	27	43	42	22	25	26	58	19	18	38	39
11	30	67	36	29	45	26	26	36	52	23	20	39	40
12	30	66	28	20	40	30	27	36	50	26	22	34	40
13	28	65	25	20	40	30	28	40	51	26	19	26	40
14	28	60	28	24	38	30	29	42	47	26	18	26	39
15	30	59	28	22	38	31	30	38	47	34	17	26	42
							31	......	34	......	16	25	......

Monthly discharge of Fayette canal near Centerfield, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
March 4-31	9.6	2.8	4.35	242
April	76	5	25.4	1,510
May	74	30	57.2	3,520
June	82	20	39.2	2,330
July	29	16	20.1	1,240
August	26	12	19.4	1,190
September	38	14	20.9	1,240
October 1-5	58	15	40.8	404
1916.				
April	63	21	32.7	1,950
May	69	31	54.1	3,330
June	64	19	29.5	1,760
July	43	14	20.8	1,280
August	45	18	36.0	2,210
September	42	22	30.2	1,800

DOVER CANAL NEAR GUNNISON, UTAH.

LOCATION.—About on line between secs. 23 and 24, T. 19 S., R. 1 W., half a mile below head of canal, 3½ miles west of Gunnison, Sanpete County.

RECORDS AVAILABLE.—April 21, 1914, to September 30, 1916; irrigation seasons only.

GAGE.—Stevens water-stage recorder on left bank, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Earth section. Canal carries large quantities of silt and has very low grade. A submerged weir, 30 feet below gage, serves as control, but stage-discharge relation is at times affected by backwater from below the weir.

DIVERSIONS.—Probably above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation changed several times during seasons of 1915 and 1916 by manipulation of the flash boards below gage. Several poorly defined rating curves used. Operation of water-stage recorder satisfactory throughout irrigation season. Daily discharge ascertained by applying to rating table, either directly or by shifting-control method, the mean daily gage height determined by inspecting recorder graph. Records fair.

Canal diverts water from left bank of Sevier River in the SW. ¼ sec. 24, T. 19 S., R. 1 W., about 1½ miles above confluence of San Pitch and Sevier Rivers. Water used for irrigation.

Discharge measurements of Dover canal near Gunnison, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 22	J. C. Dort	5.09	18.8	April 6	E. A. Porter	5.00	20.2
May 7	.....do	5.66	28.2	24	.....do	5.51	19.3
June 2	.....do	6.09	41.2	May 11	.....do	6.14	54.2
12	.....do	5.74	44.4	27	.....do	5.79	32.3
17	.....do	5.52	33.4	June 3	.....do	5.46	40.8
26	.....do	5.65	36.4	26	.....do	5.60	36.3
July 6	.....do	5.60	27.8	July 2	J. W. Thurston	5.70	35.5
9	Porter and Dort	6.18	27.4	15	E. A. Porter	5.78	45.9
17	J. C. Dort	6.13	23.9	19	Sanford and Porter	5.46	34.0
29	.....do	5.52	21.7	22	E. A. Porter	5.35	27.2
Aug. 2	.....do	5.94	32.0	Aug. 7	J. W. Thurston	5.38	29.2
31	.....do	5.93	21.4	18	E. A. Porter	5.43	30.2
Sept. 16	.....do	5.46	22.0	Sept. 8	.....do	5.38	27.3
Oct. 5	L. W. Jordan	5.32	20.8	18	Sanford and Porter	5.74	39.7
				26	E. A. Porter	5.68	38.1

Daily discharge, in second-feet, of Dover canal near Gunnison, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	3.7	22	41	38	27	22	27
2	....	2.9	23	42	37	28	24	26
3	0.6	2.9	24	....	36	19	20	17
4	.2	4.5	25	....	34	20	21	16
5	.6	9.0	26	....	34	15	15	21
6	.2	10	28	....	29	10	12	....
7	.0	10	28	....	25	8	10	....
8	.0	10	30	....	21	8	10	....
9	.0	9	28	....	26	9	20	....
10	.0	9	31	....	24	19	24	....
11	5.0	12	30	....	23	20	24	....
12	7.8	16	32	46	22	20	34	....
13	4.5	16	35	47	22	17	29	....
14	3.7	14	38	43	22	12	21	....
15	3.7	16	38	44	22	16	21	....
16	3.7	26	36	40	23	17	22	....
17	3.7	28	42	37	25	16	25	....
18	6.5	24	42	40	26	15	33	....
19	12	26	35	38	25	13	32	....
20	12	24	40	34	28	17	29	....
21	12	24	....	34	31	20	26	....
22	12	22	....	38	33	19	24	....
23	12	21	....	37	34	20	22	....
24	10	22	....	36	21	24	20	....
25	10	21	....	38	20	26	20	....
26	10	21	....	37	14	20	22	....
27	9	21	....	36	15	15	24	....
28	5.6	21	....	35	26	22	28	....
29	.0	20	....	37	23	20	29	....
30	.0	21	....	39	25	21	27	....
31	2.0	....	....	....	26	21	....	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	31	21	43	40	34	16	......	43	50	28	23	40
2	......	37	28	40	44	33	17	......	45	50	34	27	39
3	......	48	42	43	50	34	18	......	49	50	36	27	34
4	......	50	52	42	36	34	19	......	44	38	32	26	27
5	......	49	62	41	32	33	20	......	54	29	33	27	29
6	......	51	65	40	24	33	21	......	57	36	31	26	24
7	......	48	64	43	32	30	22	......	46	40	26	26	11
8	......	48	58	47	38	29	23	......	49	42	28	31	20
9	......	56	49	15	44	29	24	......	47	40	22	35	34
10	......	62	40	0	40	37	25	30	46	35	34	28	38
11	......	54	42	0	51	31	26	33	39	36	48	31	38
12	......	53	35	11	31	31	27	31	34	32	40	34	38
13	......	53	36	43	23	36	28	37	34	32	41	38	37
14	......	48	50	43	15	36	29	43	37	30	38	34	29
15	......	44	55	41	20	38	30	35	42	34	35	32	34
							31	......	27	......	40	33	......

NOTE.—1915: Unreliable gage-height record, discharge estimated, May 21–31, 41 sec.-ft.; June 3–11, 44, sec.-ft. 1916: No gage-height record, discharge estimated, Apr. 1–24, 30 sec.-ft., July 12–14, as given in table.

Monthly discharge of Dover canal near Gunnison, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
March 3-31	12	0	5.06	291
April	28	2.9	16.2	964
May	42	22	35.0	2,150
June	47	34	40.5	2,410
July	38	14	26.1	1,600
August	28	8	17.9	1,100
September	34	10	23.0	1,370
October 1-5	27	16	21.4	212
1916.				
April	....	....	[a] 31.0	1,840
May	62	27	46.0	2,830
June	65	21	42.4	2,520
July	48	0	33.5	2,060
August	51	15	32.2	1,980
September	40	11	32.3	1,920

[a] Estimated.

SAN PITCH RIVER NEAR GUNNISON, UTAH.

LOCATION.—In NW. ¼ SW. ¼ sec. 13, T. 19 S., R. 1 W., about one-fifth of a mile below a small diversion dam, half a mile above confluence with Sevier River, and 3 miles west of Gunnison, Sanpete County.

DRAINAGE AREA.—886 square miles (measured on topographic maps).

RECORDS AVAILABLE.—February 21, 1912, to September 30, 1916. June 30, 1900, to December 31, 1905, at a point about 4 miles northeast of Gunnison.

GAGE.—Stevens continuous water-stage recorder on right bank, at new datum, May 18, 1914, to September 30, 1916; vertical staff on left bank about one-fifth mile below small diversion dam, February 21, 1912, to May 17, 1914.

DISCHARGE MEASUREMENTS.—Made from cable about 10 feet below gage, from bridge just below gage, or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifting; right bank is high but left is low and subject to overflow.

EXTREMES OF DISCHARGE.—Not determined.

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued temporarily during December, January and February.

DIVERSIONS.—In years of normal flow practically all the water of this stream is used for irrigation in the San Pete Valley and in the vicinity of Gunnison. Winter and spring run-off is stored in the Gunnison reservoir, about 7 miles above Gunnison. At times part of the water flowing past the gage is waste from the Kearns-Robbins (Fayette) canal (diverting from Sevier River), which crosses the San Pitch about half a mile above the gage.

REGULATION.—Flow controlled by Gunnison reservoir. See "Diversions."

ACCURACY.—Stage-discharge relation changed during winter. Rating curves fairly well defined by frequent measurements. Operation of water-stage recorder satisfactory, except as noted in footnote to table of daily discharge. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records for irrigation season good.

Discharge measurements of San Pitch River near Gunnison, Utah, for the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	L. W. Jordan	1.40	2.8	Mar. 17	E. A. Porter	3.61	448
Nov. 4	J. J. Sanford	1.36	2.3	19	.....do	2.32	94
22	L. W. Jordan	1.34	1.4	Apr. 3	.....do	2.66	216
Dec. 15	A. B. Purton	1.85	21.2	7	.....do	2.10	62
Jan. 5	.....do	a 2.82	12.9	14	.....do	1.31	3
Feb. 2	J. J. Sanford	a 2.26	1.9	18	J. J. Sanford	1.82	30.5
16	.....do	2.02	21.1	Sept 26	E. A. Porter	1.04	0.0

a Complete ice cover above, at, and below gage.

Daily discharge, in second-feet, of San Pitch River near Gunnison, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	Day.	Oct.	Nov.	Dec.	Apr.	May.	June.
1	2	8	......	192	3	1	16	5	2	22	11	14	4
2	2	7	......	192	3	2	17	4	2	25	16	15	2
3	2	3	......	192	3	3	18	4	2	30	21	15	1
4	3	2	2	126	3	3	19	4	2	38	14	17	......
5	3	2	......	117	3	4	20	4	2	22	14	16	......
6	3	2	......	69	3	4	21	4	2	12	14	12	......
7	3	3	......	60	4	4	22	6	2	15	6	15	......
8	3	2	......	58	5	4	23	6	2	12	4	21	......
9	4	2	......	44	6	4	24	11	2	6	3	18	......
10	4	2	......	36	7	4	25	16	3	......	3	15	......
11	4	2	......	28	8	4	26	14	2	......	3	12	......
12	4	2	......	20	9	4	27	10	2	......	3	8	......
13	8	2	......	12	10	4	28	10	3	......	3	4	......
14	5	3	......	3	11	4	29	9	3	......	3	3	......
15	5	3	22	6	13	4	30	8	2	......	3	2	......
							31	8	......	......	......	1	......

NOTE.—Stream dry June 19 to Sept. 30. Gage not operating Dec. 1–3, 5–14, 25–31., Jan. 1 to Mar. 31. Discharge interpolated for following dates when gage was not operating: Apr. 1–2, 10–13, 16–17, 23, 25–28, 30, May 1–5, 7–12, 24–27, 29–31, and June 2, 17, and 18.

Monthly discharge of San Pitch River near Gunnison, Utah, for the year ending Sept. 30 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	16	2	5.7	350
November	8	2	2.6	155
December			a 9.0	550
April	192	3	43	2,560
May	17	1	9.0	550
June	4	0	2.0	120

a Estimated.

WELLINGTON CANAL NEAR MILLS, UTAH.

LOCATION.—In SE. ¼ sec. 3, T. 16 S., R. 2 W., 300 feet below wasteway, 2 miles below canal heading, and 4 miles north of Mills post office, Juab County.

RECORDS AVAILABLE.—June 1, 1914, to September 30, 1916; irrigation seasons only; miscellaneous measurements in 1913.

GAGE.—Stevens water-stage recorder, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge 250 feet above gage.

CHANNEL AND CONTROL.—Bed composed of fine gravel and sand. Growth of moss and weeds causes backwater at gage during part of irrigation season.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation subject to frequent changes due to backwater from growth of moss below station and to flat gradient of canal. Rating curves poorly defined. Water-stage recorder not in operation at times, as clock stopped. Daily discharge ascertained by applying to rating table, either directly or by shifting-control method, the mean daily gage height determined by inspecting recorder graph. Discharge estimated for periods of defective gage-height record. Records poor.

Canal diverts water from left bank of Sevier River in the NE. ¼ sec. 15, T. 16 S., R. 2 W. Water is used for irrigation west of Sevier River near Mills.

Discharge measurements of Wellington canal near Mills, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 15	J. C. Dort	1.88	26.4	May 10	E. A. Porter	1.60	18.7
June 5	do	1.08	8.8	June 9	do	1.74	21.6
18	do	1.70	14.4	24	do	1.78	15.1
July 20	do	1.94	5.8	July 17	do	1.88	10.8
Aug. 11	do	1.76	9.5	Aug. 8	J. W. Thurston	1.91	12.2
Sept. 2	do	.99	4.8	13	R. H. Becknell	1.75	10.5
7	do	1.35	9.2	29	E. A. Porter	1.45	11.2
19	do	.69	3.1	Sept. 30	do	1.80	15.6
Oct. 7	L. W. Jordan	.60	[a] 0.8				

[a] Discharge estimated.

Daily discharge in second-feet, of Wellington canal near Mills, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							1915.						
1		12	8	8	5	5	16	26	13	7	9	3	
2		11	8	8	5	5	17	26	14	7	6	4	
3		11	6	8	6	4	18	26	14	7	6	4	
4		11	6	8	5	4	19	26	11	5	7	3	
5		9	6	8	4	4	20	26	9	6	7	2	
6		8	5	8	4	2	21	23	11	6	6	11	
7		7	4	9	7	1	22	21	15	6	6	11	
8		9	6	9	10		23	20	14	6	6	11	
9		9	7	9	9		24	20	10	6	6	12	
10		10	8	9	9		25	17	11	6	6	12	
11		10	8	9	6		26	14	9	6	5	13	
12		8	8	11	5		27	13	8	6	5	14	
13	16	10	8	11	4		28	13	8	6	5	10	
14	26	13	7	11	4		29	13	8	6	5	6	
15	26	13	7	10	3		30	13	8	6	5	5	
							31	10		4	5		

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1916.						1916.					
1	24	0	14	2	11	16	16	21	12	11	14
2	24	0	13	2	10	17	14	22	11	12	15
3	24	10	13	2	10	18	14	23	11	14	15
4	24	20	15	3	10	19	14	17	10	13	16
5	24	20	13	0	10	20	14	16	9	14	16
6	24	22	13	0	10	21	14	16	7	16	16
7	24	23	13	5	10	22	14	16	6	14	16
8	24	23	13	11	10	23	12	16	6	10	16
9	24	22	13	6	10	24	10	15	6	17	16
10	19	23	13	5	11	25	8	15	6	17	16
11	20	22	0	8	13	26	6	16	5	16	16
12	20	22	0	10	12	27	4	14	2	16	16
13	19	21	0	11	13	28	0	10	1	13	16
14	16	20	10	11	13	29	0	13	1	11	16
15	16	20	12	11	14	30	0	14	1	11	16
						31			1	11	

NOTE.—1915: Canal reported dry prior to May 12. No gage-height record, discharge estimated, May 13–14, 25, July 12–15.
1916: No gage-height record, discharge estimated, May 1–9, 23–27, July 5–16, Sept. 13–19, 21–30.

Monthly discharge of Wellington canal near Mills, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).	Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
1915.			1916.		
May 13-31	19.7	744	May	15.0	920
June	10.5	625	June	17.1	1,020
July	6.39	393	July	8.1	500
August	7.45	458	August	9.8	600
September	6.90	411	September	13.4	800
October 1-7	3.57	50			

SEVIER RIVER LAND & WATER CO.'S CANAL NEAR LEAMINGTON, UTAH.

LOCATION.—In sec. 28, T. 14 S., R. 3 W., 200 feet below head of canal, half a mile above old Parley siding on the Los Angeles & Salt Lake Railroad, and about 7 miles northeast of Leamington, Millard County.

RECORDS AVAILABLE.—April 21, 1914, to September 30, 1916.

GAGE.—Stevens water-stage recorder on left bank, 100 feet above second tunnel, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made from footbridge 400 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and clay. Sill of tunnel serves as control.

ICE.—Canal freezes over during the winter when water is usually being diverted for storage in Fool Creek reservoir.

DIVERSIONS.—None above station from this canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage discharge changed several times during 1915, and once during 1916. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table, either directly or by shifting-control method, the mean daily gage height determined by inspecting recorder graph, except for days of considerable variation, for which the means of hourly discharge were used. Records for irrigation seasons excellent; those for rest of period good.

Canal diverts water from left bank of Sevier River just below reservoir, in the SE. ¼ sec. 28, T. 14 S., R. 3 W. Water is used for irrigation and for storage in Fool Creek reservoir.

Discharge measurements of Sevier River Land & Water Co.'s canal near Leamington, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Oct. 10	R. W. Davenport	3.19	90	Nov. 29	L. W. Jordan	0.70	14.6
Nov. 19	J. J. Sanford	.30	7.1	Dec. 11	.....do	— .14	0.4
1915.				1916.			
Feb. 8	Lynn Crandall	[a] 1.62	4.9	Feb. 16	.....do	1.60	33.9
Mar. 14	L. W. Jordan	1.12	22.9	Mar. 29	E. A. Porter	3.12	87
Apr. 28	J. C. Dort	3.08	90	Apr. 11	.....do	3.62	100
May 16	.....do	2.80	74	May 2	.....do	3.16	88
17	.....do	1.28	27.1	17	.....do	.47	9.0
June 6	.....do	2.68	72	29	.....do	3.30	94
21	J. W. Thurston	3.52	106	June 28	Cottrell and Jacob	3.60	108
July 12	.....do	3.51	103	29	E. A. Porter	2.82	78
29	L. W. Jordan	2.70	67	July 22	E. A. Jacob	2.68	67
Aug. 19	Lynn Crandall	2.66	68	29	E. A. Porter	2.71	70
Sept. 5	J. C. Dort	1.19	26.9	Aug. 13	J. W. Thurston	3.38	103
Oct. 10	L. W. Jordan	1.78	39.9	30	Porter and Jacob	2.80	69
13	F. W. Cottrell	1.98	46.8	Sept. 25	E. A. Jacob	4.10	123
Nov. 4	.....do	2.65	70	25	F. W. Cottrell	4.11	122
4	.....do	1.15	24.0	27	E. A. Jacob	4.48	140

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Sevier River Land & Water Co.'s canal near Leamington, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.										
1	86	90	....	26	49	90	77	106	68	34
2	79	90	....	25	51	87	64	104	68	35
3	88	90	4	25	45	86	64	104	27	42
4	90	90	4	25	40	80	64	103	....	38
5	90	79	5	26	42	76	68	103	....	27
6	90	87	5	25	55	74	71	103	....	27
7	90	87	5	26	60	71	70	104	19	27
8	90	87	5	25	59	70	71	103	68	28
9	90	87	10	25	52	71	73	97	69	29
10	90	87	....	24	54	71	77	105	68	30
11	90	87	....	24	55	71	79	105	68	30
12	90	87	....	24	58	71	80	99	68	29
13	90	80	....	24	62	72	81	93	68	29
14	90	80	....	24	62	72	82	93	68	28
15	90	72	....	16	62	75	83	93	67	26
16	90	56	....	....	62	73	79	92	67	26
17	90	40	....	....	62	45	83	92	66	26
18	90	17	....	....	64	28	92	92	67	26
19	90	8	....	....	65	28	98	92	67	26
20	90	6	....	....	70	40	93	91	67	34
21	90	6	....	....	72	49	103	84	67	38
22	90	7	....	....	73	48	111	81	62	45
23	90	4	26	....	75	48	121	75	57	45
24	90	3	26	....	80	47	120	69	52	46
25	90	....	26	....	95	47	114	69	38	47
26	90	....	26	....	98	48	111	68	37	47
27	90	....	27	....	92	54	110	69	36	48
28	90	....	26	....	90	53	108	68	36	50
29	90	....	....	....	89	57	107	68	36	51
30	90	....	....	....	90	74	107	68	36	51
31	90	....	....	27	....	80	....	68	35	....

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915-16.											
1	53	23	14	2	39	95	91	99	79	70	63
2	53	23	12	2	39	99	87	99	79	70	60
3	60	23	3.4	2	38	103	83	103	79	72	60
4	77	28	2.3	2	37	103	83	103	79	72	60
5	77	23	2.0	13	40	99	83	99	83	74	60
6	74	21	2.0	21	44	99	83	91	81	74	60
7	52	20	1.7	23	42	95	83	87	81	77	58
8	35	20	1.4	23	25	103	83	81	79	81	60
9	36	20	1.2	28	4	107	83	87	74	87	72
10	41	20	.9	34	3	107	83	99	75	91	86
11	45	20	.6	35	26	107	95	103	81	95	86
12	46	20	.6	34	48	107	99	99	77	99	94
13	37	18	22	33	47	79	86	83	70	99	106
14	25	16	46	33	42	36	5	83	72	99	108
15	25	16	46	34	41	119	4	79	70	99	108
16	23	16	43	36	41	123	5	77	70	98	108
17	22	15	31	37	41	115	9	79	70	98	108
18	22	15	18	38	46	115	11	81	70	97	110
19	22	16	11	41	50	127	43	81	70	91	110
20	22	16	4.2	46	53	127	70	79	70	91	110
21	22	15	3.5	46	54	131	66	79	70	90	110
22	22	15	2.8	46	56	127	74	79	68	90	110
23	23	15	2.4	46	56	115	91	79	72	89	112
24	23	15	2.0	43	52	115	95	77	79	89	120
25	23	14	1.7	40	56	119	99	79	79	88	122
26	23	14	1.7	38	58	123	95	77	77	88	120
27	23	14	2	38	83	111	95	75	75	92	128
28	23	14	2	40	87	95	95	77	70	84	138
29	23	14	2	40	87	91	95	77	72	72	135
30	22	14	2	....	91	91	95	79	70	69	126
31	22	....	2	....	91	....	99	....	70	63	....

NOTE.—[a] Gage out of commission Dec. 7-10, Feb. 2-4, Mar. 11 and 18; discharges interpolated.

NOTE.—1914-15: Canal reported dry Nov. 25 to Dec. 25, Jan. 6 to Feb. 2, Mar. 16-30, Aug. 4-6. Canal frozen, discharge estimated, Dec. 26 to Jan. 5, 10 second-feet; Feb. 3-9, as given in table; and Feb. 10-22, 22 second-feet. Clock stopped Nov. 7-12; discharge estimated from recorded change of stage. Shifting-control method used Apr. 29-30, July 21-23. Hourly discharge determined Nov. 5, Mar. 15, 31, May 16, 17, 20, 29, 30, June 1, 5, 20, 22, July 9, Aug. 3, 7, 22, 24, Sept. 2, 4, 20. 1915-16: No gage-height record, discharge interpolated, Dec. 7-10 Feb. 2-4, Mar. 11, 18. Discharge estimated Jan. 1-31, 2 second-feet. Shifting-control method used Aug. 16-25. Hourly discharge determined Oct. 3, 7, 13, 16, Nov. 4, Dec. 13, Feb. 5, Mar. 8, Apr. 14, May 13, 19.

Monthly discharge of Sevier River Land & Water Co.'s canal near Leamington, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914-15.				
October	90	79	89.5	5,500
November	90	0	47.6	2,830
December	....	....	1.9	117
January	....	....	1.6	98
February	27	0	17.2	955
March	26	0	12.6	775
April	98	40	66.1	3,930
May	90	28	63.1	3,880
June	121	64	88.7	5,280
July	106	68	89.1	5,480
August	69	0	50.1	3,080
September	51	26	35.5	2,110
The year	121	0	47.0	34,000
1915-16.				
October	77	22	35.3	2,170
November	28	14	17.8	1,060
December	46	0.6	9.27	570
January	....	....	2.00	123
February	46	2.0	30.8	1,770
March	91	3.0	48.9	3,010
April	131	36	106	6,310
May	99	4.0	73.2	4,500
June	103	75	85.7	5,100
July	83	68	74.5	4,580
August	99	63	85.4	5,250
September	138	58	96.9	5,770
The year	138	....	60.3	40,200

McINTYRE CANAL NEAR LEAMINGTON, UTAH.

LOCATION.—In NW. ¼ sec. 32, T. 14 S., R. 3 W., 400 feet below canal intake and about 6 miles northeast of Leamington, Millard County.

RECORDS AVAILABLE.—May 5, 1914, to September 30, 1916, irrigation seasons only; miscellaneous measurements in 1913.

GAGE.—Stevens water-stage recorder on right bank, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed composed of gravel. Moss and weeds grow in canal during the irrigation season.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation not permanent. Measuring section poor on account of flat gradient and vegetation. Rating curves poorly defined. Operation of water-stage recorder satisfactory.

Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph; for days of considerable variation the means of hourly discharge were used.

Canal diverts water from right bank of Sevier River in the SE. ¼ sec. 29, T. 14 S., R. 3 W. Water used for irrigation west of the river near Leamington.

Discharge measurements of McIntyre canal near Leamington, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Dis- charge.	Date.	Made by—	Gage height.	Dis- charge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 28	J. C. Dort	1.70	21.7	May 2	E. A. Porter	1.57	21.9
May 16	do	1.58	17.0	17	do	1.82	25.4
June 6	do	1.62	18.4	29	do	1.53	18.3
21	J. W. Thurston	1.80	22.0	June 29	do	2.04	25.4
July 12	do	1.52	14.9	July 22	Johnson and Jacob	2.00	23.0
28	L. W. Jordan	1.74	19.4	29	E. A. Porter	1.54	16.7
Aug. 19	Lynn Crandall	1.66	18.8	Aug. 13	J. W. Thurston	1.86	23.7
Sept. 5	J. C. Dort	1.56	16.0	25	do	1.92	22.0
Oct. 10	L. W. Jordan	.80	2.5	30	Jacob and Porter	1.71	19.9
13	F. W. Cottrell	1.18	5.4				

Daily discharge, in second-feet, of McIntyre canal near Leamington, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							
1	......	15	10	19	20	19	13
2	......	18	15	19	20	17	13
3	......	20	19	19	20	18	12
4	......	19	19	19	20	18	7
5	......	19	19	19	20	17	3
6	......	19	18	19	20	17	4
7	......	18	18	19	20	16	4
8	......	18	18	18	20	18	3
9	7.7	18	18	18	19	18	3
10	7.5	18	19	18	19	20	3
11	7.3	19	19	18	18	20	......
12	7.9	22	18	16	18	19	......
13	9.0	22	18	16	18	19	......
14	11	22	18	16	18	18	......
15	11	20	17	16	17	14	......
16	11	18	17	18	12	11	......
17	14	16	10	18	5.2	12	......
18	18	16	0.4	18	16	12	......
19	19	15	0.9	14	19	11	......
20	20	15	13	6.2	19	8.0	......
21	22	18	22	16	19	7.1	......
22	22	20	23	21	19	18	......
23	23	19	23	20	20	20	......
24	22	19	21	20	19	19	......
25	24	19	20	19	18	16	......
26	23	18	20	20	15	16	......
27	22	18	20	21	15	17	......
28	22	18	20	20	18	18	......
29	23	18	19	20	20	18	......
30	21	16	19	20	20	15	......
31	......	13	......	20	19	......	......

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	22	22	24	23	21	16	16	22	21	22	0	22
2	......	22	23	24	23	21	17	17	22	22	21	0	21
3	......	22	23	24	23	20	18	17	21	22	19	15	21
4	......	22	23	24	22	20	19	17	20	22	18	24	21
5	......	23	24	25	23	20	20	16	19	14	20	24	21
6	......	23	24	26	23	20	21	16	18	0	24	24	21
7	......	23	24	26	23	19	22	16	19	7	24	24	21
8	......	23	24	26	22	20	23	19	21	22	24	24	21
9	......	23	24	26	22	21	24	21	20	23	23	23	21
10	......	24	24	25	20	21	25	21	19	23	23	23	21
11	......	24	23	25	20	21	26	22	18	23	23	23	21
12	......	24	20	26	22	21	27	22	18	23	22	22	20
13	......	23	20	26	22	21	28	23	18	21	20	22	21
14	8	23	21	25	22	22	29	22	19	23	19	21	20
15	15	22	21	23	15	22	30	22	21	24	16	21	19
							31	......	21	......	20	21	......

Monthly discharge of McIntyre canal near Leamington, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
April 9-30	24	7.3	16.7	729
May	22	13.0	18.2	1,120
June	23	.4	17.0	1,010
July	21	6.2	18.1	1,110
August	20	5.2	18.1	1,110
September	20	7.1	16.2	964
October 1-10	13	2.6	6.5	129
1916.				
April 14-30	23	0	10.0	595
May	24	18	21.3	1,310
June	24	0	21.0	1,250
July	26	16	23.0	1,410
August	24	0	20.5	1,260
September	22	19	20.7	1,230

LEAMINGTON CANAL NEAR LEAMINGTON, UTAH.

LOCATION.—In SW. ¼ sec. 32, T. 14 S., R. 3 W., 200 feet below head of canal and 6 miles northeast of Leamington, Millard County.

RECORDS AVAILABLE.—April 20, 1914, to September 30, 1916; irrigation seasons only; miscellaneous measurements in 1913.

GAGE.—Stevens water-stage recorder on right bank, with inside and outside staff gages.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge 150 feet below gage.

CHANNEL AND CONTROL.—Bed composed of gravel. Concrete wall about 6 feet below gage serves as control, but gravel fills in at times between gage and control, causing changes in stage-discharge relation. Growth of moss in canal below control causes backwater at times, except for low stages.

DIVERSIONS.—Above all diversions from canal.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation permanent except for periods in summer when heavy moss growth produced backwater over control at stages exceeding 2 feet. Two fairly well defined rating curves used for season of 1915, one well defined curve for 1916. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph; shifting-control method used for period April 28 to May 15, 1915. Records good.

Canal diverts water from left bank of Sevier River, in the SW. ¼ sec. 32, T. 14 S., R. 3 W. Water is used for irrigation near Leamington, east of river.

Discharge measurements of Leamington canal near Leamington, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 27	J. C. Dort	2.20	46.0	Mar. 29	E. A. Porter	1.26	2.5
May 16	do	2.02	26.5	Apr. 11	do	1.62	13.5
June 6	do	1.54	9.1	May 2	do	2.02	43.6
21	J. W. Thurston	1.30	3.4	17	do	1.95	37.8
July 12	do	1.76	22.0	29	do	1.79	23.7
28	L. W. Jordan	1.82	24.0	June 30	do	1.63	16.7
Aug. 19	Lynn Crandall	1.34	3.8	July 29	do	1.65	15.7
19	do	1.76	21.3	Aug. 30	Jacob and Porter	1.72	20.4
Sept. 5	J. C. Dort	1.55	10.3				
Oct. 10	L. W. Jordan	1.40	6.0				

Daily discharge, in second-feet, of Leamington canal near Leamington, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	....	0.1	38	13	16	24	13	22
2	....	.1	37	14	16	24	11	20
3	....	.1	36	14	16	24	13	20
4	....	.1	33	14	16	24	13	20
5	....	.1	31	12	16	22	11	16
6	....	.2	29	10	16	18	10	11
7	....	.2	28	10	17	18	11	7
8	....	.2	28	11	22	18	15	5
9	....	.2	29	12	20	18	20	5
10	....	.2	28	14	20	19	21	6
11	....	.2	28	16	21	20	16	....
12	....	.4	27	17	22	20	16	....
13	....	.5	26	19	22	21	16	....
14	0.1	.8	26	19	23	22	14	....
15	.1	4	27	20	24	22	8	....
16	.1	4	27	22	24	23	7	....
17	.1	8	28	19	24	23	8	....
18	.1	14	28	5	24	19	8	....
19	.1	18	28	5	25	8	7	....
20	.1	25	29	4	25	22	5	....
21	.1	32	25	4	25	24	3	....
22	.1	33	19	6	25	24	9	....
23	.1	34	10	8	24	24	13	....
24	.1	33	5	16	24	23	14	....
25	.1	48	5	24	24	20	16	....
26	.1	51	5	19	24	18	16	....
27	.1	48	5	16	24	16	18	....
28	.1	45	5	16	24	16	20	....
29	.1	41	11	16	24	16	22	....
30	.1	39	14	16	24	16	22	....
31	.1	....	14	....	24	14	....	....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	......	47	28	17	20	21	16	12	40	21	35	23	21
2	......	45	28	20	21	21	17	12	38	21	36	23	21
3	......	44	28	20	23	21	18	11	36	21	38	23	21
4	......	43	28	21	24	21	19	12	32	21	37	23	21
5	......	42	29	23	28	20	20	28	29	20	32	23	20
6	......	43	30	23	28	20	21	38	27	20	28	24	20
7	......	43	30	22	26	20	22	35	26	20	27	24	20
8	......	42	30	22	20	23	23	13	26	19	26	24	21
9	10	41	30	21	16	24	24	6	27	19	26	23	23
10	15	40	30	22	19	23	25	6	26	17	25	23	26
11	15	40	28	21	23	23	26	20	26	18	21	23	26
12	15	38	28	23	28	23	27	45	26	18	20	22	22
13	14	39	28	30	29	22	28	45	25	16	15	22	22
14	14	43	27	30	28	21	29	45	25	15	17	23	20
15	14	42	21	30	23	21	30	50	25	16	19	20	19
							31	......	27	......	22	21	......

Monthly discharge of Leamington canal near Leamington, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
March 14-31	0.1	0.1	0.10	4
April	51.0	.1	16.0	952
May	38.0	4.6	22.8	1,400
June	24.0	3.6	13.6	809
July	25.0	16.0	21.8	1,340
August	24.0	8.0	20.0	1,230
September	22.0	3.0	13.2	786
October 1-10	22.0	5.2	13.2	262
1916.				
April 9-30	50	0	15.8	940
May	47	25	35.3	2,170
June	30	15	23.5	1,400
July	38	15	24.8	1,520
August	29	16	23.2	1,430
September	26	19	21.6	1,290

CANAL A NEAR DELTA, UTAH.

Location.—In SE. ¼ sec. 26, T. 16 S., R. 6 W., about a quarter of a mile below head gates and 8 miles northeast of Delta, Millard County.

Records available.—April 14, 1912, to September 30, 1916; irrigation seasons only.

Gage.—Gurley printing water-stage recorder on right bank one-fourth mile below head gates since March 14, 1913; inclined staff gage at same site and datum, April 14, 1912, to March 14, 1913.

Discharge measurements.—Made from cable about 80 feet below gage.

Channel and control.—Uniform earth section. No well-defined control. Stage-discharge relation probably affected by growth of moss and weeds farther down canal and by silt collecting in the channel.

Diversions.—No diversions between head gates and gage. About 6 miles below the canal divides into canal B and canal C.

Regulation.—Flow regulated at the head gates.

Accuracy.—Stage-discharge relation fairly permanent; affected during summer by moss growing in canal below gage.

Several well-defined rating curves used. Mean daily gage height determined by averaging gage heights printed every 15 minutes by water-stage recorder. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying mean daily gage height to rating tables; shifting-control method used July 12-21 and Sept. 1-3, 1916. Records good.

Cooperation.—Gage-height records furnished and many discharge measurements made by lower Sevier River Water Commissioner.

Canal diverts water from Sevier River in the SE. ¼ sec. 26, T. 16 S., R. 6 W., and is used jointly by the Delta Land & Water Co., and by the Melville Irrigation Co. About 6 miles below gage the canal divides into canal B, which serves the north side tract of the Delta Land & Water Co., and canal C, which serves the Melville Irrigation Co. Canal C will be enlarged to serve the south tract of the Delta Land & Water Co. Waste waters only are returned to the river.

Discharge measurements of canal A near Delta, Utah, during the years ending Sept. 30, 1915 and 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Nov. 21	J. J. Sanford	1.91	59	Nov. 19	J. C. Dort	2.44	100
				28	do	1.85	49.4
1915.							
Apr. 30	Dort and Cottrell	4.54	396	1916.			
June 9	J. C. Dort	2.58	111	Mar. 25	E. A. Porter	0.97	1.0
28	F. W. Cottrell	4.47	352	Apr. 9	do	1.69	47.8
July 1	J. W. Thurston	3.76	256	27	do	4.92	443
21	J. C. Dort	3.25	186	May 8	do	5.40	508
Aug. 4	F. W. Cottrell	3.50	220	9	do	5.24	475
20	Lynn Crandall	3.50	202	22	do	3.75	256
24	F. W. Cottrell	3.62	235	June 8	do	3.58	235
26	do	2.00	64	July 10	J. W. Thurston	3.33	210
Sept. 4	Dort and Cottrell	1.35	15.7	31	E. A. Porter	2.66	98
Oct. 9	L. W. Jordan	2.67	115	Aug. 2	J. W. Thurston	1.63	37.3
18	F. W. Cottrell	3.00	151	19	E. A. Porter	3.53	215
28	do	3.87	264	31	Jacob and Porter	3.32	184
Nov. 5	J. C. Dort	3.14	168	Sept. 4	E. A. Porter	2.78	135
11	F. W. Cottrell	3.66	239	21	do	3.19	185
12	J. C. Dort	3.65	231				

Daily discharge, in second-feet, of canal A near Delta, Utah, for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.									
1	288	232	11	19	352	70	274	199	59
2	281	220	8	19	366	86	267	207	55
3	274	216	7	17	359	100	281	218	52
4	281	223	5	15	352	96	274	222	30
5	274	212	4	25	336	82	260	227	33
6	274	210	4	25	322	66	212	232	35
7	274	220	4	39	322	73	176	229	32
8	274	228	4	37	344	83	164	229	32
9	253	238	4	15	352	102	154	238	32
10	239	252	4	19	366	116	154	245	40
11	253	232	4	24	390	145	182	243	56
12	253	216	4	30	406	182	212	240	111
13	227	192	4	46	414	219	232	235	133
14	232	180	....	90	422	253	232	235	121
15	233	186	....	124	430	212	226	228	105
16	229	180	....	135	422	194	212	227	118
17	222	172	....	139	422	246	206	233	134
18	216	126	....	140	438	309	200	227	135
19	227	80	....	165	406	351	194	215	133
20	254	61	....	198	314	366	188	215	135
21	273	57	....	233	177	366	176	235	138
22	282	58	....	262	170	388	169	242	138
23	282	58	....	284	131	410	171	245	139
24	275	52	....	306	133	410	163	243	146
25	267	36	....	314	97	396	156	126	147
26	257	25	....	314	86	380	156	65	136
27	257	23	....	329	60	366	149	80	126
28	254	21	....	359	48	351	156	68	131
29	250	18	....	390	42	337	164	60	152
30	249	14	....	374	39	309	180	70	170
31	252	....	....	....	48	....	195	71	....

Daily discharge, in second-feet, of canal A near Delta, Utah, for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.									
1	165	120	65	32	500	200	114	52	104
2	171	89	65	30	500	206	116	59	110
3	165	121	50	62	518	206	101	39	122
4	165	149	37	38	536	206	100	35	135
5	184	171	33	34	536	218	100	38	141
6	190	190	22	47	536	293	86	52	137
7	190	196	13	75	518	286	114	63	120
8	190	203	12	72	518	244	176	63	112
9	121	203	12	48	500	314	188	52	112
10	96	217	10	48	483	321	200	88	118
11	79	224	10	83	466	321	218	159	153
12	76	231	9	130	449	321	293	184	182
13	81	231	....	144	440	359	272	196	149
14	93	217	....	152	440	383	272	217	160
15	119	203	....	200	440	383	284	224	165
16	135	196	....	218	407	344	290	217	176
17	142	159	....	265	375	314	268	224	194
18	152	106	....	293	367	351	288	231	182
19	159	92	....	307	391	328	274	224	170
20	159	96	....	307	336	336	259	210	170
21	159	101	....	328	279	351	252	231	188
22	159	104	....	351	258	359	217	231	194
23	165	97	....	367	265	336	190	217	182
24	177	85	....	367	279	336	177	196	182
25	196	79	....	351	272	344	190	203	165
26	224	81	....	367	251	336	210	184	151
27	252	63	....	432	251	336	203	190	182
28	266	56	....	466	286	300	190	184	200
29	266	55	....	483	314	238	165	190	206
30	252	65	....	500	321	129	151	196	206
31	231	....	....	....	232	....	90	126	....

NOTE.—No flow Dec. 14, 1914, to Mar. 31, 1915, and Dec. 13, 1915, to Mar. 31, 1916.

Monthly discharge of canal A near Delta, Utah, for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914–15.				
October	288	216	257	15,800
November	252	14	141	8,390
December	11	0	2.2	133
January	....	....	0	0
February	....	....	0	0
March	....	....	0	0
April	390	15	150	8,930
May	438	39	276	17,000
June	410	66	235	14,000
July	281	149	198	12,200
August	245	60	195	12,000
September	170	30	100	5,950
The year	....	....	....	94,400
1915–16.				
October	266	76	167	10,300
November	231	56	140	8,330
December 1-12	65	9	28	670
January	....	....	0	0
February	....	....	0	0
March	....	....	0	0
April	500	30	220	13,100
May	536	232	396	24,300
June	383	129	300	17,900
July	293	86	195	12,000
August	231	35	154	9,470
September	206	104	159	9,460

BEAVER RIVER BASIN.

BEAVER RIVER NEAR BEAVER, UTAH.

LOCATION.—In SE. ¼ sec. 13, T. 29 S., R. 7 W., half a mile above city diversion dam at mouth of canyon, 3 miles above Beaver, Beaver County.

DRAINAGE AREA.—82 square miles.

RECORDS AVAILABLE.—June 15 to September 26, 1906; March 15, 1914, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank Novenber 14, 1914, to September 30, 1916; Lietz recorder March 30 to November 13, 1914. Datum of recording gages 0.03 foot lower than that of old vertical staff gage at same site, used prior to March 30, 1914. Gage inspected by G. W. Valentine.

DISCHARGE MEASUREMENTS.—Made from footbridge 70 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders and coarse gravel; fairly permanent. One channel; left bank is overflowed at extremely high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.93 feet at 7 p. m. May 9 (discharge, 412 second-feet); minimum stage, 2.57 feet at 7 a. m. January 28 (discharge, 8 second-feet).

1914–1916: Maximum stage recorded, 5.48 feet, May 21, 1914 (discharge, 650 second-feet); minimum stage, 2.57 feet, January 28, 1916 (discharge, 8 second-feet).

ICE.—Stage-discharge relation seriously affected by ice at times.

DIVERSIONS.—Above all irrigation diversions. Above the station is a small storage reservoir known as Cants Lake. Water is diverted by the Beaver River Power Co., but returned to the river several miles above the station.

REGULATION.—Flow probably not affected by operation of Beaver River Power Co. plant, but is affected by Cants Lake storage reservoir.

ACCURACY.—Stage-discharge relation permanent except as affected by ice. Rating curve fairly well defined between 25 and 80 second-feet; poorly defined above. Operation of water-stage recorder satisfactory except for frequent breaks in record during October and November. Daily discharge ascertained by applying to rating table, the mean daily gage height determined by inspecting gage height graph. Discharge estimated for periods of broken record and ice effect, as noted in footnote to table of daily discharge. Records good.

Discharge measurements of Beaver River near Beaver, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 14	L. W. Jordan	2.93	25.0	Mar. 28	C. C. Jacob	3.24	57
Jan. 12	E. A. Porter	[a] 3.27	16.7	May 23	A. B. Purton	4.12	208
Feb. 8	J. J. Sanford	2.87	22.9	July 31	A. M. Gilbert [b]	3.31	62
8	do	2.87	22.5				

[a] Stage-discharge relation affected by ice.
[b] Engineer for Beaver County Irrigation Co.

Daily discharge, in second-feet, of Beaver River near Beaver, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	26		23			28	45	165	207	84	77	40
2	27		24			25	49	167	207	82	75	39
3			25			26	50	178	207	80	112	39
4			25			27	47	209	212	79	84	39
5			25		27	27	45	249	218	77	78	40
6		27	26		25	26	44	294	212	78	72	37
7			24		24	26	44	314	203	80	84	37
8			25		23	26	46	325	196	79	69	38
9	28		25		26	28	56	356	203	75	63	44
10			26		26	36	78	340	203	75	61	40
11			26		26	43	90	320	186	75	56	40
12			24	17	26	44	78	308	176	87	55	42
13		28	26		24	48	73	280	167	86	54	38
14		28	25		25	48	78	237	163	84	53	39
15		28	27		27	44	90	209	163	82	50	42
16	31	28	24		28	47	108	194	153	80	53	36
17	30	28			28	52	118	188	144	73	47	35
18	29	29			28	54	104	192	137	63	43	39
19		27			28	55	94	203	132	61	39	43
20		27			28	64	88	186	124	60	39	35
21		26			26	67	95	176	119	63	39	37
22		27			29	67	112	190	110	63	39	37
23	26	26			30	67	140	196	100	58	39	35
24	26	26			29	59	158	184	97	59	38	35
25	26	22			29	52	162	167	91	73	39	39
26		25			26	53	169	165	87	70	41	37
27		26			30	53	205	173	87	73	39	31
28		23			28	55	249	182	94	69	42	30
29		27			28	52	240	196	93	62	46	32
30	26	25				49	186	212	87	73	42	32
31	26					45		216		66	41	

NOTE.—Oct. 1 to Nov. 12, gage not operating satisfactorily; discharge estimated or interpolated as follows: Oct. 3–8, 27 second-feet; Oct. 10–15, 30 second-feet; Oct. 19–22, 28 second-feet; Oct. 26–29, 26 second-feet; Nov. 1–5, 26 second-feet; and Nov. 7–12, 27 second-feet. Mean flow estimated on account of ice as follows: Nov. 15–16, 28 second-feet; Dec. 17–31, 20 second-feet; Jan. 1–11, 17 second-feet; Jan. 13–31, 16 second-feet; and Feb. 1–4, 22 second-feet.

Monthly discharge of Beaver River near Beaver, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October			27.7	1,700
November			26.5	1,580
December			22.6	1,390
January			16.4	1,010
February	30		26.3	1,510
March	67	25	44.9	2,760
April	249	44	105	6,250
May	356	165	225	13,800
June	218	87	153	9,100
July	87	58	73.2	4,500
August	112	38	55.1	3,390
September	44	30	37.6	2,240
The year	356		67.8	49,200

BEAVER RIVER AT ADAMSVILLE, UTAH.

LOCATION.—In S. ½ sec. 30, T. 29 S., R. 8 W., 100 yards below highway bridge on road from Milford to Beaver, a quarter of a mile above mouth of Indian Creek, and three-quarters of a mile south of Adamsville, Beaver County.

DRAINAGE AREA.—272 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 16, 1913, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank 5 feet below cable, March 13, 1914, to September 30, 1916; inspected by W. A. Rees. Friez water-stage recorder at same site December 16, 1913, to March 12, 1914.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed composed of fine gravel. Permanent concrete control constructed July 11, 1916. Stage of zero flow, about 1.2 feet. Banks low; covered with willows; overflowed at extremely high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4 feet at 8 p. m. August 5 (discharge, 427 second-feet); minimum stage, 1.30 feet at 9 p. m. July 1 (discharge, 3 second-feet).

1914–1916: Maximum stage recorded, 4.26 feet at 5 a. m. June 3, 1914 (discharge, 544 second-feet); minimum stage, 1.30 feet at 9 p. m. July 1, 1916 (discharge, 3 second-feet).

ICE.—Stage-discharge relation seriously affected by ice for short periods.

DIVERSIONS.—No diversions between the station and the storage reservoir of the Beaver County Irrigation Co. There are a number of ditches above the station supplying the Adamsville and Beaver districts.

REGULATION.—Low-water flow affected by irrigation diversions.

ACCURACY.—Since July 11, 1916, stage-discharge relation permanent; previously subject to change. Rating curve well defined below 150 second-feet. Water-stage recorder operated satisfactorily throughout the year except during winter when station was icebound at times. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Several rating tables used for various periods previous to July; shifting-control method used for periods of change in rating. Records good for October, November, March, April, May, and June; excellent for July, August, and September· fair for December, January, and February.

Discharge measurements of Beaver River near Adamsville, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 15	L. W. Jordan	1.96	51	June 12	A. M. Gilbert	1.86	48.4
Jan. 13	E. A. Porter	[a]2.17	49.7	19	do	1.59	21.8
Feb. 9	J. J. Sanford	1.93	56	20	do	1.41	8.5
9	do	1.93	59	July 13	do	1.40	6.3
Mar. 28	Jacob and Gilbert	2.28	118	15	do	1.67	24.4
May 20	A. M. Gilbert[b]	2.27	132	16	do	1.71	27.3
23	A. B. Purton	2.11	93	26	do	1.88	45.6
30	A. M. Gilbert	1.81	47.9	Aug. 6	do	2.46	120
June 6	do	1.78	41.0				

[a] Stage-discharge relation affected by ice.
[b] Project manager Beaver County Irrigation Co.

Daily discharge, in second-feet, of Beaver River at Adamsville, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	19	23	45	......	......	60	101	111	47	3.4	35	16
2	18	23	45	......	......	60	104	94	47	4.2	35	17
3	18	23	46	......	......	62	102	81	48	4.2	69	17
4	20	24	46	44	......	72	99	83	44	3.8	59	17
5	20	24	47	47	53	85	94	92	45	3.8	163	17
6	20	31	47	45	53	64	90	108	45	3.8	123	16
7	20	50	47	46	56	56	86	153	47	3.8	78	17
8	20	44	46	51	56	52	86	162	46	......	65	17
9	18	41	46	55	70	54	85	186	46	......	59	18
10	16	42	46	47	72	58	95	192	50	......	53	18
11	15	42	46	44	76	62	120	173	50	......	43	18
12	15	44	46	......	80	70	111	160	46	9.0	40	18
13	18	42	46	......	74	72	104	144	44	8.0	40	20
14	17	40	46	......	75	76	102	118	41	13	38	21
15	18	46	46	......	76	82	110	106	36	24	33	21
16	21	50	46	48	76	86	118	92	33	27	32	20
17	22	51	46	46	70	89	130	85	31	28	30	17
18	25	51	46	......	64	92	120	75	27	26	22	16
19	26	52	46	......	62	92	105	85	20	26	18	14
20	26	51	......	......	58	98	89	120	9.0	20	16	14
21	24	48	......	......	51	105	86	98	7.0	18	14	14
22	24	50		......	51	108	80	90	5.4	21	13	14
23	24	48	......	46	48	120	77	90	5.8	27	11	13
24	22	47	......	48	48	117	90	79	5.4	37	11	13
25	19	46	......	52	47	102	98	70	5.4	41	11	13
26	19	47	43	50	48	111	98	60	5.4	46	10	13
27	22	48	46	46	54	112	105	55	4.6	45	11	12
28	22	45	......	48	58	117	136	52	4.6	47	11	13
29	22	46	......	48	54	116	180	47	4.6	40	12	14
30	22	47	......	48	......	110	139	51	4.2	35	13	15
31	22	......	......	48	......	101	......	48	......	36	16	......

NOTE.—Mean discharge estimated, because of ice, as follows: Dec. 20–25, 43 second-feet; Dec. 28 to Jan. 3, 44 second-feet; Jan. 12–15, 46 second-feet; Jan. 18–22, 45 second-feet; Feb. 1–4, 50 second-feet. Mean discharge estimated while artificial control was being installed July 8–11, 5 second-feet.

Monthly discharge of Beaver River at Adamsville, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	26	15	20.5	1,260
November	52	23	42.2	2,510
December	47	....	45.4	2,790
January	55	....	46.6	2,870
February	80	....	59.7	3,430
March	120	52	85.8	5,280
April	180	77	105	6,250
May	192	47	102	6,270
June	50	4.2	28.5	1,700
July	47	3.4	20.3	1,250
August	163	10	38.2	2,350
September	21	12	16.1	958
The year	192	3.4	50.8	36,900

BEAVER RIVER AT ROCKYFORD DAM, NEAR MINERSVILLE, UTAH.

Location.—In NW. ¼ sec. 11, T. 30 S., R. 9 W., half a mile below Rockyford dam and 4 miles above Minersville, Beaver County.

Drainage area.—512 square miles (measured on topographic maps).

Records available.—December 18, 1913, to September 30, 1916.

Gage.—Friez water-stage recorder on right bank, at present site June 1 to September 30, 1916; Friez water-stage recorder at former site 1,000 feet below dam December 18, 1913, to May 31, 1916; no determined relation between old and new datum. Between these two points inflow from springs amounted in June, 1916, to about 8 second-feet, varying with stage of water in reservoir. Observers, A. N. Stoddard and A. M. Gilbert.

Discharge measurements.—Made from cable near present gage or by wading.

Channel and control.—Bed composed of gravel; some vegetal growth. One channel at all stages. Banks not subject to overflow. Stage of zero flow, 0.6 foot. At upper site bed composed of rocks and boulders. Rocks embedded in concrete, 15 feet below gage, serve as control. One channel. Right bank high; left bank low. Stage of zero flow, about 1.9 feet.

Extremes of discharge.—Maximum stage recorded during year, 1.66 feet from 8 p. m. August 23 to 3 p. m. August 24, at lower site (discharge, 168 second-feet); minimum stage recorded, 1.88 feet, November 11–18, at upper site (discharge, 2 second-feet).

1913–1916: Maximum stage recorded, 5.37 feet, June 6, 1914 (discharge, 366 second-feet); minimum stage, 1.68 feet, March 19 and 20, 1914 (discharge estimated 0. 3 second-foot).

Ice.—Stage-discharge relation not affected by ice.

Diversions.—None between dam and station.

Regulation.—Flow controlled by operation of gates at Rockyford dam.

Accuracy.—Stage-discharge relation at both sites permanent. Rating curves well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating tables the mean daily gage height determined by inspecting recorder graph. Records good.

Discharge measurements of Beaver River at Rockyford dam, near Minersville, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
	Upper site.				**Lower site.**		
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 15	L. W. Jordan	1.90	1.0	May 17	A. M. Gilbert [a]	1.30	97
Feb. 9	J. J. Sanford	2.36	[b] 7.2	21	do	1.13	72
May 23	A. B. Purton	3.55	72	June 5	do	1.46	132
				6	do	1.32	105
				25	do	1.51	137
				July 13	do	1 34	114
				26	do	0.72	31.3

[a] Project manager, Beaver County Irrigation Co.

[b] Discharge at lower station, 15.4 sec.-ft.

Daily discharge, in second-feet, of Beaver River at Rockyford dam near Minersville, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	28	14	4	4	7	12	11	104	136	140	52	34
2	26	30	4	4	7	12	11	104	136	123	49	34
3	25	30	4	4	7	12	11	104	136	110	16	33
4	26	30	4	5	7	12	11	110	131	113	15	33
5	26	30	4	5	7	12	11	114	126	121	31	33
6	22	29	4	5	8	12	11	114	126	123	41	33
7	28	18	4	6	8	12	11	114	126	121	46	32
8	25	11	4	6	8	12	11	114	126	124	58	32
9	23	14	4	6	8	12	11	114	126	124	88	32
10	22	2	4	6	8	12	11	114	126	105	113	32
11	21	2	4	6	9	12	11	110	110	105	138	32
12	22	2	4	6	9	12	12	107	101	103	144	33
13	23	2	4	6	9	11	12	102	103	105	144	34
14	25	2	4	7	9	11	19	102	110	105	142	34
15	28	2	4	7	9	11	30	102	110	105	144	34
16	29	2	4	7	10	11	33	102	110	103	147	34
17	25	2	4	7	10	11	30	93	108	103	144	34
18	26	2	4	7	11	11	30	91	121	103	149	33
19	27	2	4	7	11	11	33	87	140	105	149	33
20	28	3	4	7	11	11	39	83	136	108	147	124
21	28	3	4	7	11	11	44	83	110	113	149	153
22	28	3	4	7	11	11	53	73	113	113	151	115
23	28	5	4	7	11	11	66	68	136	113	151	36
24	28	3	4	7	12	11	69	67	136	115	162	36
25	28	3	4	7	12	11	81	65	136	69	155	77
26	28	3	4	7	12	11	95	58	121	32	157	103
27	28	3	4	7	12	11	92	64	136	32	159	101
28	28	3	4	8	12	11	104	58	144	33	151	98
29	28	3	4	8	12	11	106	83	142	33	123	64
30	28	3	4	7	......	11	104	113	140	37	119	34
31	25	......	4	7	......	11	......	128	......	48	98	......

NOTE.—Daily discharge Oct. 1 to May 31 at upper site; June 1 to Sept. 30 at lower site. See station description. About 8 second-feet inflow between upper and lower sites.

Monthly discharge of Beaver River at Rockyford dam, near Minersville, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	29	21	26.1	1,600
November	30	2	8.63	514
December	4	4	4.00	246
January	8	4	6.35	390
February	12	7	9.59	552
March	12	11	11.4	701
April	106	11	39.1	2,330
May	128	58	95.0	5,460
June	142	101	125	7,440
July	140	32	96.4	5,930
August	162	15	114	7,010
September	153	32	52.3	3,110

NOTE.—See footnote to table of daily discharge.

INDIAN CREEK AT ADAMSVILLE, UTAH.

LOCATION.—In sec. 30, T. 29 S., R. 8 W., at highway bridge just east of Adamsville, Beaver County, about three-quarters of a mile above confluence with Beaver River.

DRAINAGE AREA.—180 square miles (measured on topographic map).

RECORDS AVAILABLE.—June 26 to August 31, 1906; March 16, 1914, to September 30, 1916.

GAGE.—Vertical staff nailed to left bridge abutment; read by W. A. Rees.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of rocks, gravel, and sand. Rock control, semi-permanent. One channel at all stages. Banks high and not subject to overflow under ordinary conditions.

Extremes of discharge.—Maximum stage recorded during year, 6.2 feet at 3 p. m. August 5 (discharge, not estimated); minimum discharge, 0.1 second-foot, April 30 and September 15–19.

1914–1916: Maximum stage recorded, 6.3 feet during night of September 2, 1915 (discharge not determined); minimum stage, 1.70 feet March 24–28 and April 1–2, 1914 (no flow).

Ice.—Stage-discharge relation affected by ice at times.

Diversions.—Below all diversions. At certain seasons a small amount of seepage (probably not more than 1 or 2 second-feet) enters between gage and mouth of creek.

Regulation.—Flow affected by small storage reservoir and irrigation diversions above.

Accuracy.—Stage-discharge relation not permanent. Affected by ice at times, November 13 to February 7. Rating curves not well defined and only roughly approximate above 15 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating tables except for days of floods, when rough hourly discharge graphs were drawn and mean for the day was determined by inspection. Records poor.

Discharge measurements of Indian Creek at Adamsville, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 14	L. W. Jordan	2.08	0.4	Feb. 9	J. J. Sanford	2.74	8.4
Jan. 13	E. A. Porter	(a)	.6	May 23	A. B. Purton	2.50	1.8

a Ice in stream and gage height of no value; flow estimated.

Daily discharge, in second-feet, of Indian Creek at Adamsville, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.3	0.5	....	1.9	10	1.5	0.2	0.3	52	0.4
2	1.0	.6	....	2.1	11	1.4	3	3	13	.4
3	8	.5	....	1.9	11	1.0	3	3	.7	1.2
4	.6	.6	....	1.9	14	.4	.3	.3	.6	1.0
5	.6	.6	....	2.1	14	.4	.3	.3	67	1.0
6	.6	1.3	....	1.9	12	.2	.4	.2	4.0	.7
7	.6	18	....	1.9	11	.2	.7	.5	.9	.7
8	1.0	2.0	22	1.9	8.9	.3	1.0	.5	.4	.3
9	1.0	2.2	18	2.2	10	.3	1.1	.4	.2	.4
10	1.0	3.0	22	3.0	8.4	.3	.7	.3	.7	.6
11	1.0	2.4	52	3.5	7.3	.3	1.1	.3	.7	.5
12	1.0	2.2	52	3.0	7.8	.3	1.4	.4	.3	.4
13	.3	....	62	2.7	6.9	.4	1.1	.3	.2	.2
14	.4	....	22	2.8	6.0	2.0	3.9	.3	.2	.2
15	1.8	....	52	2.8	5.5	2.9	1.7	.3	.2	.1
16	1.9	....	22	3.5	8.6	1.4	.4	.3	.2	.1
17	2.0	....	14	4.3	11	1.8	1.2	.3	.3	.1
18	.8	....	14	6.0	15	2.9	1.1	.3	.3	.1
19	.7	....	3.5	6.9	16	4.5	.4	.2	.3	.1
20	.6	....	2.4	7.3	14	3.2	.6	.2	.4	.2
21	.6	....	3.8	10.0	15	3.9	.3	.3	.5	.3
22	.6	....	2.2	8.4	16	5.0	.3	.2	.4	.2
23	.5	....	2.1	6.2	13	2.9	.3	.2	.4	.3
24	.3	....	2.1	5.1	11	2.9	.3	.3	.4	.3
25	2.0	....	2.1	2.1	10	1.8	.3	.2	.2	.2
26	2.4	....	2.2	2.1	.3	2.0	.3	.2	.3	.2
27	2.0	....	2.2	10	.2	2.5	.2	.3	.2	.2
28	1.0	....	2.2	14	.2	1.1	.2	.2	.2	.5
29	.6	....	2.4	20	.2	1.0	.2	.2	.5	.6
30	.4	....	....	7.3	.1	.6	.2	.3	.6	.6
31	.4	....	....	8.4	....	.3	....	.4	.5	....

Note.—Mean discharge estimated on account of ice as follows: Nov. 13–30, 0.3 second-foot; Dec. 1–31, 0.4 second-foot; Jan. 1 to Feb. 7, 0.5 second-foot.

Monthly discharge of Indian Creek at Adamsville, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	2.4	0.3	0.96	59.0
November	18		13.1	78.0
December			.40	24.6
January			.50	30.7
February	62	.5	13.2	759
March	20	1.9	5.1	314
April	16	.1	9.15	544
May	5.0	.2	1.60	98.4
June	3.9	.2	.693	41.2
July	.5	.2	.294	18.1
August	67	.2	4.74	291
September	1.2	.1	.403	24.0
The year	67	.1	3.14	2,280

COAL CREEK NEAR CEDAR CITY, UTAH.

Location.—In E. ½ sec. 13, T. 36 S., R. 11 W., 500 feet above power plant and 1¾ miles southeast of Cedar City, Iron County.

Drainage area.—92. 5 square miles (measured on topographic maps).

Records available.—May 28, 1915, to September 30, 1916.

Gage.—Vertical staff on right bank August 24 to September 30, 1916; May 28 to July 24, 1915, vertical staff about 150 feet upstream; July 29, 1915, to August 4, 1916, vertical staff at approximately same site as present gage. These gages have no established relation to a common datum. Read by J. T. Wilkinson.

Discharge measurements.—Made from highway bridge about a mile below, or by wading.

Channel and control.—Bed composed of coarse gravel and boulders; shifting.

Extremes of discharge.—Not determined.

Ice.—Stage-discharge relation affected by ice.

Diversions.—The only important diversion above the station is power canal, which returns the water to the stream about 500 feet below gage. This diversion is fairly constant, 6 to 8 second-feet, and should be added to obtain the total flow above Cedar City.

Regulation.—None.

Accuracy.—Stage-discharge relation changed during floods. Rating curves poorly defined. Staff gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating tables, or interpolated or estimated for days of missing or defective gage height. Records poor.

Discharge measurements of Coal Creek near Cedar City, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 13	L. W. Jordan	0.67	2.2	Apr. 1	C. C. Jacob	1.00	37.6
Feb. 10	J. J. Sanford	.64	7.9	May 30	A. B. Purton	1.53	151

Discharge measurements of Coal Creek tailrace near Cedar City, Utah, during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 13	L. W. Jordan	0.95	7.3	Apr. 1	C. C. Jacob	0.90	7.6
Feb. 10	J. J. Sanford	.92	8.0	May. 30	A. B. Purton	.80	4.1

Daily discharge, in second-feet, of Coal Creek near Cedar City, Utah, for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.0	1.5	0.5	......	6	13	41	153	170	24	28	36
2	1.0	1.0	1.5	......	7	14	44	183	164	24	253	33
3	1.0	1.0	.5	......	8	14	48	261	170	23	1,300	33
4	1.0	1.0	1.5	......	8	16	48	340	180	20	......	33
5	1.0	1.0	1.0	......	8	14	54	415	189	20	......	33
6	.5	1.0	1.0	......	8	14	54	480	164	20	......	33
7	.5	3.0	.5	......	10	16	54	450	141	20	......	31
8	.5	2.0	1.5	......	8	12	54	415	141	20	......	51
9	.5	2.0	1.0	......	10	16	54	425	153	19	......	51
10	.5	2.0	.5	......	8	21	116	380	141	18	......	36
11	.5	1.0	.5	......	10	23	73	340	128	16	......	33
12	.5	1.5	2.0	......	11	26	58	315	116	15	......	33
13	.5	1.5	.5	......	12	26	54	253	103	16	......	33
14	.5	8.0	1.0	......	14	24	73	218	94	54	......	33
15	1.5	2.5	2.5	......	12	23	98	183	94	18	......	33
16	1.5	2.5	.5	10	14	24	96	183	94	16	......	33
17	1.5	1.5	8.5	8	12	33	94	202	81	14	......	33
18	1.5	1.5	1.0	12	12	33	90	268	72	14	......	33
19	1.5	1.5	1.0	7	13	33	81	189	62	14	......	33
20	1.5	1.5	1.0	7	12	48	94	183	58	13	......	33
21	1.0	1.5	1.0	12	12	94	121	210	54	14	......	33
22	1.0	1.0	1.0	12	12	73	176	238	48	14	......	94
23	1.0	1.0	1.0	7	14	69	226	202	41	14	......	38
24	1.0	1.0	1.0	7	14	51	276	158	40	14	24	38
25	1.0	.5	1.0	7	13	54	238	141	38	26	24	38
26	1.0	1.5	2.5	7	13	58	300	136	35	31	24	38
27	1.0	.5	.5	7	14	65	355	170	33	98	23	36
28	1.0	3.0	.5	2	14	54	370	186	31	26	24	36
29	1.0	1.5	.5	3	17	48	253	202	28	18	69	36
30	1.0	1.0	.5	4	......	41	203	189	26	24	44	36
31	1.0	......	.5	5	......	48	......	183	......	31	36	......

NOTE.—Gage not read Apr. 8, 16, 23, 30, May 7, 14, 21, 28, June 4, 11, 18, 24, 25, July 2, 9, 16, 23, 30; discharge interpolated. Gage out of order Aug. 4–23. Mean discharge Jan. 1–15 estimated 5 second-feet, because of ice.

See footnote to table of monthly discharge.

Monthly discharge of Coal Creek near Cedar City, Utah, for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	1.5	0.5	1.0	60
November	8	.5	1.7	100
December	8.5	.5	1.2	75
January	12	2	6.2	380
February	17	6	11.2	645
March	94	12	35.4	2,180
April	370	41	153	9,100
May	480	136	253	15,600
June	189	26	96.3	5,730
July	98	13	22.8	1,400
September	94	31	37.4	2,230

NOTE.—Mean discharge of tailrace, about 8 second-feet, should be added to flow past the station to get total flow of Coal Creek.

MINOR BASINS IN NEVADA.

SNAKE CREEK NEAR BAKER, NEV.

LOCATION.—In NW. ¼ sec. 16, T. 12 N., R. 70 E., in White Pine County, at Mathews ranch, 3 miles below Tilford tungsten mine, 6 miles west of Garrison, Utah, 13 miles from Baker, Nev., and 67 miles southeast of Ely, Nev.

DRAINAGE AREA.—About 45 square miles (measured on maps issued by Forest Service).

RECORDS AVAILABLE.—June 23, 1916, to January 15, 1917, when station was discontinued; fragmentary record at gage 3 miles upstream August 13, 1913, to September 30, 1915.

GAGE.—Vertical staff on left bank 50 feet below footbridge opposite ranch house; read by T. W. Mathews; original gage, vertical staff on right bank at tungsten mine 3 miles upstream, August 13, 1913, to September 30, 1915.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel. One channel. Banks not subject to overflow. Control fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.06 feet at noon June 23 (discharge, 28 second-feet); minimum stage, 0.07 foot at 9 a. m. December 8 (discharge not determined).

1913–1916: Maximum discharge, 85 second-feet, June 7, 1914; minimum discharge, 0.5 second-foot December 20, 1913.

ICE.—No information.

DIVERSIONS.—Small diversion for power at mine 3 miles upstream; water returned to stream above gage.

REGULATION.—Effect of power diversion at mine not noticeable.

ACCURACY.—Gage read to hundredths twice daily. Daily discharge not determined.

Discharge measurements of Snake Creek near Baker, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 23	a 2.15	26.4
23	b 1.06	28.3

aMeasured at former gaging station. bMeasured at new station 3 miles downstream.

Daily gage height, in feet, of Snake Creek near Baker, Nev., for the period June 23, 1916, to January 15, 1917.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1		0.95	0.54	0.28	0.38	0.32	0.24	0.24
2		.89	.54	.28	.38	.28	.24	.24
3		.95	.54	.26	.37	.28	.24	.24
4		.91	.60	.25	.36	.28	.24	.22
5		.89	.68	.25	.34	.30	.24	.22
6		.88	56	.25	.41	.29	.24	.22
7		.84	.53	.22	.40	.32	.12	.22
8		.86	.53	.23	.36	.22	.08	.22
9		.84	.50	.20	.35	.26	.08	.22
10		.83	.50	.18	.33	.30	.08	.22
11		.80	.47	.22	.33	.27	.08	.22
12		.80	.46	.22	.32	.16	.20	.22
13		.77	.44	.20	.32	.10	.22	.18
14		.80	.43	.20	.44	.10	.22	.18
15		.78	.39	.20	.38	.08	.22	.18
16		.78	.40	.17	.36	.12	.22	
17		.75	.40	.16	.34	.18	.22	
18		.74	.40	.18	.35	.22	.22	
19		.73	.40	.18	.33	.24	.22	
20		.65	.38	.18	.35	.24	.22	
21		.70	.38	.18	.34	.24	.22	
22		.67	.36	.22	.34	.24	.22	
23	1.06	.65	.32	.25	.34	.24	.22	
24	1.04	.65	.31	.23	.34	.24	.22	
25	.86	.64	.28	.22	.35	.24	.20	
26		.64	.26	.22	.34	.25	.16	
27	.86	.60	.27	.22	.34	.26	.16	
28	.86	.61	.35	.22	.32	.25	.16	
29	1.01	.58	.37	.22	.32	.25	.18	
30	.83	.57	.33	.22	.32	.24	.20	
31		.54	.30		.32		.22	

CLEVELAND CREEK NEAR OSCEOLA, NEV.

Location.—In sec. 19, T. 16 N., R. 67 E., 1½ miles southwest of Cleveland ranch buildings, 3 miles below mouth of canyon, 7 miles below junction of North and South forks, 12 miles northwest of Osceola, White Pine County, and 45 miles by road southeast of Ely.

Drainage area.—About 32 square miles (measured on maps issued by Forest Service).

Records available.—May 29, 1914, to December 31, 1916, when station was discontinued.

Gages.—No. 1, or lower gage, is vertical staff on left bank about 500 feet above diversion dam for main irrigation ditches, installed July 10, 1915, at same site, but datum 0.92 foot higher than inclined staff installed August 10, 1913; No. 2, or upper gage, is vertical staff on right bank about a mile above gage No. 1 and 200 feet above a ditch that is used intermittently. On account of its accessibility, gage No. 1 is read except when water is being carried in the upper ditch; readings by L. Snyder. (For dates that each gage was used see footnote to table of daily discharge.)

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of coarse gravel and small boulders; steep gradient; fairly permanent, but likely to shift during high water. Conditions are similar at the two gages but the control for the upper one is more permanent. Banks moderately low, with a fringe of willows; subject to overflow at extremely high stages.

Extremes of discharge.—Maximum discharge, 32 second-feet, May 9 (stage, upper gage, 1.22 feet); minimum discharge, 4.1 second-feet, December 18, 1916 (stage, upper gage, 0.72 foot).

1914–1916: Maximum discharge, 44 second-feet, June 3, 1914 (stage, upper gage, 1.40 feet); minimum discharge, 4.1 second-feet, December 18, 1916 (stage, upper gage, 0.72 foot).

Ice.—Stage-discharge relation seriously affected by ice at times.

Diversions.—Gage No. 2 is above all diversions.

Regulation.—Discharge as given shows the natural flow of stream, as the lower gage is not read when water is being diverted between the gages.

Accuracy.—Upper gage: Stage-discharge relation fairly permanent except as affected by ice December 16, 1915, to January 5, 1916, January 20 to February 7, and December 9–17, 24–29, 1916. Rating curve used October 6 to April 29 well defined between 5 and 50 second-feet; curve used May 10 to June 21 and November 12 to December 31, 1916, drawn parallel to preceding curve through a single measurement. Lower gage: Stage-discharge relation not permanent; gage not read during period of ice effect. Rating curve poorly defined. Gage read to hundredths three times a week. Daily discharge ascertained by applying gage height to rating table and by interpolating for days on which gage was not read, except for periods during which stage-discharge relation was affected by shifting control or by ice. Discharge for periods of ice effect estimated from observer's notes and weather records. Records only roughly approximate.

Discharge measurements of Cleveland Creek near Osceola, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 22, at lower gage	1.20	16.6
June 22, at upper gage	1.02	17.5

Daily discharge, in second-feet, of Cleveland Creek near Osceola, Nev., for the period Oct. 1, 1915, to Dec. 31, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915-16												
1	5.3	8.1	6.9	......	......	6.2	17	28	17	8.9	6.9	6.1
2	5.3	7.8	6.9	......	......	6.2	17	28	17	8.5	6.9	6.1
3	5.3	7.6	6.9	......	......	6.2	16	28	17	8.5	7.3	6.1
4	5.5	7.6	6.9	......	......	6.2	16	27	17	8.5	7.7	6.1
5	5.8	7.6	6.9	......	......	6.9	15	27	18	8.5	8.5	6.1
6	6.9	7.6	6.9	5.5	......	8.0	14	28	19	8.5	8.1	6.1
7	7.2	7.6	6.9	5.5	......	9.0	14	29	20	8.5	7.7	6.1
8	7.6	7.6	6.9	5.5	6.2	10	14	30	20	8.5	7.3	6.1
9	7.2	7.6	6.9	5.5	6.2	12	14	32	20	8.5	6.9	6.1
10	6.9	7.6	6.9	6.2	6.2	13	17	31	20	8.5	6.5	6.1
11	7.1	8.0	6.9	6.9	6.2	15	20	29	20	8.5	6.1	6.1
12	7.4	8.3	6.9	6.4	6.2	17	19	28	20	8.5	6.5	6.1
13	7.6	8.0	6.9	5.9	6.2	17	18	28	20	8.1	6.9	6.1
14	7.6	7.6	6.9	5.4	6.2	17	17	28	20	7.7	6.9	6.1
15	7.6	7.4	6.9	4.9	6.2	17	17	27	20	9.4	6.9	6.1
16	7.6	7.2	......	4.3	6.2	17	17	26	20	11.0	6.9	6.1
17	7.6	6.9	......	4.2	6.2	17	17	25	20	10.0	6.9	6.1
18	7.6	6.9	......	4.0	6.2	18	17	24	20	9.3	6.9	6.1
19	7.6	6.9	......	3.9	6.4	18	17	22	20	8.5	6.5	6.1
20	7.6	6.9	......	......	6.6	19	18	22	20	8.2	6.1	6.1
21	7.6	6.9	......	......	6.9	21	18	21	20	8.0	6.1	6.9
22	7.6	6.9	......	......	6.9	22	19	20	16	7.7	6.1	7.7
23	7.6	6.9	......	......	6.9	20	20	20	14	7.7	6.1	6.9
24	7.6	6.9	......	......	6.9	19	21	19	13	7.4	6.1	6.1
25	7.6	6.9	......	......	6.9	18	22	18	12	7.2	6.1	6.1
26	7.6	6.9	......	......	6.9	18	23	18	12	6.9	6.1	6.1
27	7.6	6.9	......	......	6.9	18	24	18	12	6.9	6.1	6.1
28	7.6	6.9	......	......	6.6	17	26	18	12	6.9	6.6	6.1
29	7.6	6.9	......	......	6.2	17	26	18	11	6.9	7.1	6.9
30	8.0	6.9	......	......	......	17	27	17	9.3	6.9	7.7	7.7
31	8.3	......	......	......	......	17	......	17	......	6.9	6.9	......

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1916				1916				1916			
1	8.5	7.7	7.2	11	6.9	7.7	......	21	7.7	8.8	5.4
2	9.1	7.7	6.8	12	7.7	9.7	......	22	7.7	8.8	6.0
3	9.8	7.7	6.5	13	7.7	9.7	......	23	7.7	8.4	6.6
4	10.0	7.7	6.2	14	7.7	9.7	......	24	7.7	8.0	......
5	11.0	7.7	5.8	15	7.7	9.7	......	25	7.7	8.0	......
6	11.0	7.7	5.5	16	7.7	9.7	......	26	7.7	8.0	......
7	11.0	7.7	5.2	17	7.7	9.7	......	27	7.7	7.8	......
8	8.5	7.7	4.8	18	7.7	9.2	4.1	28	7.7	7.5	......
9	8.0	7.7	......	19	7.7	8.8	4.4	29	7.7	7.2	......
10	7.5	7.7	......	20	7.7	8.8	4.8	30	7.7	7.2	8.8
								31	7.7	......	8.8

NOTE.—Discharge Oct. 1-5, 1915, and June 22 to Nov. 11, 1916, determined at lower gage; Oct. 6, 1915, to June 21, 1916, and Nov. 12 to Dec. 31, 1916, at upper gage. Mean discharge estimated on account of ice as follows: Dec. 16-31, 1915, 6.0 second-feet; Jan. 1-5, 5.5 second-feet; Jan. 20-31, 4.0 second-feet; Feb. 1-7, 5.5 second-feet ;Dec. 9-17, 1916, 4.0 second-feet; Dec. 24-29, 8.0 second-feet.

Monthly discharge of Cleveland Creek near Osceola, Nev., for the period October, 1915, to December, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915–16.				
October	8.3	5.3	7.19	442
November	8.3	6.9	7.33	436
December			6.44	396
January			4.83	297
February	6.9		6.22	358
March	22	6.2	14.8	910
April	27	14	18.6	1,110
May	32	17	24.2	1,490
June	20	9.3	17.2	1,020
July	11	6.9	8.19	504
August	8.5	6.1	6.82	419
September	7.7	6.1	6.29	374
The year	32		10.7	7,760
1916.				
October	11	6.9	8.24	507
November	9.7	7.2	8.31	494
December			5.84	359

CURRANT CREEK NEAR CURRANT, NEV.[1]

Location.—In sec. 25, T. 11 N., R. 58 E., 10 feet above highway bridge at Cazier's ranch, on road from Ely to Tonopah, 2½ miles below inflow from Cazier's reservoir, and 2 miles above Currant, Nye County.

Drainage area.—Not measured.

Records available.—May 5 to September 30, 1913; May 25, 1914, to September 30, 1916.

Gage.—Vertical staff on left bank 10 feet above highway bridge, June 24 to September 30, 1916; read by Edmund Cazier. Original gage nailed to downstream side of right bridge abutment, at different datum, washed out March 20, 1916.

Discharge measurements.—Made by wading or from bridge below gage.

Channel and control.—Bed composed of gravel and boulders; will probably scour. One channel at all stages. Banks high and clean.

Extremes of discharge.—Maximum stage recorded before gage was washed out, 3.7 feet, March 20 (discharge, 23 second-feet); minimum stage, 2.75 feet, October 10–20 and January 16 to March 7 (discharge, 4 second-feet).

1913–1916: Maximum discharge, 24 second-feet, April 30 and May 1, 1915; minimum discharge, 2.6 second-feet, September 3, 1913, and September 28, 1915.

Ice.—Stage-discharge relation not seriously affected by ice; stream fed by springs in canyon about half a mile above gage.

Diversions.—Three small irrigation ditches divert water above gage; total capacity 3 to 5 second-feet.

Regulation.—Flow somewhat affected by inflow from Cazier's reservoir, and by changes in irrigation ditches above gage.

Accuracy.—Stage-discharge relation not permanent. Rating curves very indefinite. Gage read to half-tenths once daily. Daily discharge ascertained by applying daily gage height to rating tables except January 2–15, when mean was interpolated; determinations for period of high water, March 10–20, are probably too low. Records poor.

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[1] Called "Currant Creek at Cazier's ranch" in reports previous to 1915.

Discharge measurements of Currant Creek near Currant, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 19	A. B. Purton	2.81	5.1
June 24[a]	L. W. Jordan	[b] 4.48	11.4

[a] Zero flow determined at gage height 3.70±0.1. [b] New gage, with new datum and new control.

Daily discharge, in second-feet, of Currant Creek near Currant, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	June.	July.	Aug.	Sept.
1	5	5	5	5	4	4		11	8	5
2	5	5	5		4	4		11	8	5
3	5	5	5		4	4		11	8	5
4	5	5	5		4	4		12	7	5
5	5	5	5		4	4		13	7	5
6	5	5	5		4	4		13	7	5
7	5	5	5		4	4		12	7	5
8	5	5	5		4	5		12	7	5
9	5	5	5		4	5		12	7	5
10	4	5	5		4	6		12	7	5
11	4	5	5		4	10		14	7	5
12	4	5	5		4	13		9	7	5
13	4	5	5		4	12		9	7	5
14	4	5	5		4	14		9	7	5
15	4	5	5		4	16		9	7	5
16	4	5	5	4	4	16		9	7	5
17	4	5	5	4	4	17		9	7	5
18	4	5	5	4	4	19		9	7	5
19	4	5	5	4	4	19		9	7	5
20	4	5	5	4	4	23		9	7	6
21	5	5	5	4	4			9	7	6
22	5	5	5	4	4			9	7	6
23	5	5	5	4	4			9	6	6
24	5	5	5	4	4		11	9	6	6
25	5	5	5	4	4		11	9	6	6
26	5	5	5	4	4		11	9	6	6
27	5	5	5	4	4		11	9	6	6
28	5	5	5	4	4		11	9	5	6
29	5	5	5	4	4		11	8	5	6
30	5	5	5	4			11	8	5	6
31	5		5	4				8	5	

NOTE.—Mean discharge interpolated on account of break in record Jan. 2–8, 5 second-feet; Jan. 9–15, 4 second-feet. Gage washed out on March 20 and no records were obtained until June 24.

Monthly discharge of Currant Creek near Currant, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	5	4	4.65	286
November	5	5	5.00	298
December	5	5	5.00	307
January	5	4	4.26	262
February	4	4	4.00	230
March 1–20	23	4	10.2	403
June 24–30	11	11	11.0	153
July	13	8	10.0	615
August	8	5	6.68	411
September	6	5	5.37	320

BIG WARM SPRING NEAR DUCKWATER, NEV.

Location.—300 yards below spring, about 1 mile south of Duckwater, Nye County, and about 50 miles south of Eureka.

Records available.—October 1, 1915, to September 30, 1916.

Gage.—Stevens 8-day water-stage recorder on left bank, 150 feet above head gate of Tognoni's ditch, installed November 21, 1915. Inspected by Geo. Saxton.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of sand with tules at edge. Head gate of Tognoni's ditch forms control. One channel about 1½ feet deep.

Extremes of discharge.—Maximum discharge during year, from discharge measurement, made August 25, 14.6 second-feet; minimum, from discharge measurement, made September 8, 1915, 13.2 second-feet.

Ice.—None.

Diversions.—Above all diversions.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent. Daily gage height from water-stage recorder practically disregarded and discharge estimated between current meter measurements. Flow of spring practically constant. Records good.

Discharge measurements of Big Warm Spring near Duckwater, Nev., during the period Sept. 8, 1915, to Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Remarks.
		Feet.	*Sec.-ft.*	
Sept. 8	A. B. Purton		13.2	Miscellaneous measurement, gage not yet installed.
Nov. 21	do	1.62	13.6	Gate to swamp open, Tognoni's gate closed; 1.0 second-foot leakage.
May 5	L. W. Jordan	1.65	14.3	Gate to swamp open, Tognoni's gate closed; 0.93 second-foot leakage.
6	do	1.65	14.4	Gate to swamp open, Tognoni's gate closed; 0.93 second-foot leakage.
June 25	do	1.67	14.4	
Aug. 25	do	1.56	14.6	

Monthly discharge of Big Warm Spring near Duckwater, Nev., for the year ending Sept. 30, 1916.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
October	13.3	818	May	14.4	885
November	13.5	803	June	14.4	857
December	13.5	830	July	14.5	892
January	13.5	830	August	14.6	898
February	13.5	776	September	14.6	869
March	13.5	830			
April	14.1	839	The year	14.0	10,100

DUCKWATER CREEK NEAR DUCKWATER, NEV.

Location.—In T. 12 N., R. 56 E., 200 feet below old stone building, 1½ miles below Duckwater, Nye County, 2 miles by present channel below Big Warm Spring, and about 50 miles south of Eureka.

Drainage area.—Indeterminate. Stream fed by springs.

Records available.—September 7, 1915, to September 30, 1916.

Gage.—Lietz water-stage recorder on left bank, 15 feet above weir. Inspected by Ed. Halstead.

Discharge measurements.—Made by wading 50 feet above weir.

Channel and control.—Bed composed of sand; dense growth of aquatic plants above weir pool; sharp-crested Cippoletti weir with 4.04-foot crest serves as control. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 0.90 feet at 2.30 p. m. January 28 (discharge, 12.1 second-feet); minimum stage, 0.40 feet, October 23 (discharge, 3.7 second-feet).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—A few small ditches divert from creek above gage.

REGULATION.—During summer of 1915, flow from Big Warm Spring was conducted to creek through a canal. From October 11, 1915, to September 2, 1916, flow of spring was allowed to follow natural course into large slough, creek being supplied by seepage from slough and overflow of nearly 2 second-feet.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between zero and 12 second-feet. Operation of water-stage recorder satisfactory except for occasional breaks in records due to stopping of clock. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph, except for days when clock was not running for which it was interpolated. Records excellent.

Discharge measurements of Duckwater Creek near Duckwater, Nev., during the period Sept. 7, 1915, to Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Sept. 7	A. B. Purton	0.86	11.5	May 5	L. W. Jordan	0.76	9.8
9	do	.86	11.2	June 25	do	.64	7.5
Nov. 20	do	.55	6.0	Aug. 25	do	.68	8.1

Daily discharge, in second-feet, of Duckwater Creek near Duckwater, Nev., for the period Sept. 7, 1915 to Sept. 30, 1916.

Day.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	8.9	4.4	6.2	8.4	10.0	9.3	9.5	9.5	7.7	7.6	7.2	8.1
2	......	8.8	4.5	6.4	8.4	9.7	9.3	9.5	9.5	7.6	7.6	7.2	8.1
3	......	8.9	4.5	6.4	8.4	9.5	9.3	9.5	9.5	7.6	7.6	7.2	8.1
4	......	9.0	4.5	6.5	8.4	9.5	9.3	9.5	9.5	7.6	7.4	7.2	8.1
5	......	9.2	4.5	6.7	8.4	9.1	9.3	9.5	9.5	7.6	7.4	7.2	8.1
6	......	9.3	4.5	6.9	8.4	9.5	9.1	9.5	9.5	7.4	7.4	7.4	7.9
7	11.3	9.4	4.5	7.0	8.4	9.5	9.1	9.5	9.5	7.4	7.4	7.4	7.9
8	11.2	9.5	4.7	7.0	8.6	9.5	9.1	9.5	9.3	7.4	7.4	7.4	7.7
9	11.2	6.9	4.8	7.2	8.6	9.7	9.1	9.5	9.3	7.4	7.4	7.4	7.7
10	11.2	4.3	5.0	7.2	8.6	9.7	9.3	9.7	9.3	7.4	7.4	7.2	7.7
11	9.3	4.3	5.1	7.4	8.6	9.8	9.3	9.7	9.3	7.4	7.4	7.7	7.7
12	9.8	4.3	5.3	7.4	8.8	9.5	9.3	9.7	9.1	7.4	7.4	8.1	7.6
13	10.2	4.1	5.4	7.4	8.6	9.5	9.5	9.5	9.1	7.4	7.4	8.1	7.6
14	10.6	4.1	5.4	7.6	8.8	9.8	9.5	9.5	9.1	7.4	7.4	8.1	7.6
15	10.3	4.1	5.6	7.6	8.9	9.1	9.5	9.5	9.1	7.4	7.4	8.1	7.4
16	10.0	4.1	5.6	7.6	8.9	8.9	9.5	9.7	9.1	7.4	7.4	8.1	7.4
17	9.8	4.1	5.6	7.6	10.	8.8	9.5	9.8	9.1	7.4	7.4	8.1	7.3
18	9.5	4.0	5.7	7.6	10.	8.8	9.5	9.8	8.5	7.4	7.4	8.1	7.1
19	9.5	3.9	5.7	7.6	9.5	8.8	9.5	9.8	8.1	7.4	7.2	8.1	7.0
20	9.5	3.9	5.9	7.6	9.1	8.8	9.5	10.	7.9	7.4	7.2	8.1	6.9
21	9.5	3.8	5.9	7.7	8.9	8.8	9.5	10.	7.9	7.4	7.2	8.1	6.7
22	9.5	3.7	6.1	7.9	9.1	8.8	9.5	9.8	7.9	7.6	7.2	8.1	6.7
23	9.3	3.7	6.1	8.1	9.3	8.8	9.5	9.8	7.9	7.6	7.2	8.1	6.7
24	9.3	3.8	6.2	8.1	9.8	8.8	9.5	9.8	7.9	7.6	7.4	8.1	6.5
25	9.3	3.9	6.2	8.1	10.	8.9	9.5	9.8	7.9	7.4	7.4	8.1	6.5
26	9.3	4.0	6.2	7.9	10.	9.1	9.5	9.8	7.7	7.6	7.4	8.1	6.4
27	9.3	4.1	6.2	7.9	9.8	9.1	9.5	9.8	7.7	7.6	7.2	8.1	6.2
28	9.1	4.2	6.2	7.9	9.8	9.1	9.5	9.7	7.7	7.6	7.2	8.1	6.2
29	9.1	4.3	6.2	8.1	10.	9.1	9.5	9.5	7.7	7.6	7.2	8.1	6.2
30	8.9	4.4	6.2	8.1	10.	......	9.5	9.5	7.7	7.6	7.2	8.1	6.1
31	......	4.4	......	8.1	10.	......	9.5	......	7.7	......	7.2	8.1	......

NOTE.—Daily discharge interpolated, Sept. 12–13, 15–17, Oct. 3–7, 9, 17–22, 24–29, Jan. 9, July 9–12 and Sept. 17–20.

Monthly discharge of Duckwater Creek near Duckwater, Nev., for the period Sept. 7, 1915 to Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
September 7-30	11.3	8.9	9.83	468
1915-16.				
October	9.5	3.7	5.46	336
November	6.2	4.4	5.42	323
December	8.1	6.2	7.45	458
January	10.0	8.4	9.11	560
February	10.0	8.8	9.24	531
March	9.5	9.1	9.40	578
April	10.0	9.5	9.66	575
May	9.5	7.7	8.66	532
June	7.7	7.4	7.49	446
July	7.6	7.2	7.35	452
August	8.1	7.2	7.82	481
September	8.1	6.1	7.24	431
The year	10.	3.7	7.86	5,700

LEES CREEK NEAR PAHRUMP, NEV.

LOCATION.—In sec. 6, T. 20 S., R. 56 E., 10 feet above old weir, 16 miles northeast of Manse ranch and 22 miles east of Pahrump, Clark County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 1 to September 30, 1916, when station was discontinued.

GAGE.—Stevens 8-day water-stage recorder on right bank 10 feet above old weir; inspected by A. M. Quill.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of large boulders; gradient steep. Control is rectangular suppressed wier with 6.68 feet crest. One channel at all stages. Except at extremely high water entire flow of creek sinks in gravel bed within about 5 miles from gage.

EXTREMES OF DISCHARGE.—Maximum stage during period, from water-stage recorder, 1.45 feet at 2.30 a. m. July 15 (discharge, 37 second-feet); minimum stage, 0.16 foot, September 27-29 (discharge, 0.5 second-foot).

ICE.—No information.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 0 and 22 second-feet. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph. Records excellent.

Discharge measurements of Lees Creek near Pahrump, Nev., during the period Apr. 1 to Oct. 6, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 2	L. W. Jordan	0.90	8.8	July 7	A. M. Quill	0.52	1.8
7	A. M. Quill	.80	6.5	14	....do	.50	1.5
14	....do	.82	6.9	21	....do	.52	1.9
21	....do	1.00	12.8	28	....do	.49	1.4
28	....do	1.12	17.5	Aug. 4	....do	.48	1.5
May 5	....do	1.02	13.4	11	....do	.44	1.2
12	....do	.90	8.9	18	....do	.40	1.2
19	....do	.80	6.5	25	....do	.38	1.0
26	....do	.72	5.3	Sept. 1	....do	.34	.9
June 2	....do	.70	4.9	8	....do	.30	0.8
9	....do	.68	4.5	15	....do	.24	0.6
16	....do	.64	3.6	22	....do	.20	0.6
23	....do	.58	2.6	29	....do	.16	0.5
30	....do	.56	2.4	Oct. 6	....do	.18	.5

Daily discharge, in second-feet, of Lees Creek near Pahrump, Nev., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	9.0	12.0	4.9	2.4	1.5	0.9	16	10.0	7.1	3.8	3.7	1.2	0.7
2	8.9	11.0	4.7	2.4	1.7	.9	17	12.0	6.6	3.7	2.9	1.1	.7
3	8.7	12.0	4.7	2.3	1.6	.9	18	12.0	6.2	3.5	2.6	1.1	.6
4	8.0	14.0	4.7	2.3	1.5	.9	19	12.0	6.4	3.5	2.3	1.0	.6
5	7.3	15.0	4.5	2.2	1.5	.9	20	12.0	6.0	3.2	2.0	1.0	.6
6	6.8	13.0	4.5	2.2	1.4	.8	21	13.0	6.0	3.0	1.9	1.0	.6
7	6.8	12.0	4.5	1.7	1.4	.8	22	14.0	6.2	2.7	1.9	1.0	.6
8	8.0	12.0	4.4	1.6	1.4	.8	23	16.0	6.2	2.7	1.9	1.0	.6
9	9.9	11.0	4.4	1.6	1.4	.8	24	18.0	5.8	2.8	1.7	1.0	.6
10	12.0	10.0	4.4	1.6	1.3	.8	25	18.0	5.5	2.8	1.6	1.0	.6
11	11.0	9.6	4.4	1.6	1.3	.7	26	20.0	5.1	2.7	1.6	1.0	.5
12	8.9	9.2	4.2	1.6	1.3	.7	27	20.0	5.3	2.6	1.6	1.0	.5
13	7.8	8.4	4.0	1.6	1.3	.7	28	20.0	5.3	2.4	1.5	1.0	.5
14	7.3	8.0	4.0	2.0	1.2	.7	29	19.0	5.3	2.4	1.5	.9	.5
15	8.4	7.5	4.0	12.0	1.2	.7	30	16.0	5.3	2.4	1.5	.9	.5
							31	......	5.1	......	1.5	.9	......

Monthly discharge of Lees Creek near Pahrump, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April	20	6.8	12.0	714
May	15	5.1	8.32	512
June	4.9	2.4	3.68	219
July	12	1.5	2.28	140
August	1.7	.9	1.20	73.8
September	0.9	.5	.69	41.1
The period	20	.5	4.69	1,700

INTERMITTENT SPRINGS NEAR PAHRUMP, NEV.

Location.—In sec. 6, T. 21 S., R. 56 E., 500 feet below spring, 13 miles east of Manse ranch, and 19 miles southeast of Pahrump, Clark County.

Drainage area.—Indeterminate. Stream fed by three springs, the flow of which is intermittent.

Records available.—March 31 to September 30, 1916, when station was discontinued.

Gage.—Stevens 8-day water-stage recorder on left bank, 20 feet about old weir; inspected by A. M. Quill.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of large boulders; steep gradient. Control is 7-foot rectangular, contracted weir. One channel at all stages. Except at extreme high water, entire flow of creek sinks into gravel of stream bed within 8 to 10 miles of source.

Extremes of discharge.—Maximum stage during period, from water-stage recorder, 1.60 feet, April 29 (discharge, 39 second-feet); minimum stage, 0.47 foot, September 29 and 30 (discharge, 0.4 second-foot).

Ice.—No information.

Diversions.—None.

Regulation.—None.

Accuracy.—Stage-discharge relation permanent. Rating curve well defined. Operation of water-stage recorder satisfactory. Daily discharge determined by applying to rating table, the mean daily gage height determined by inspecting recorder graph. Records excellent.

Discharge measurements of Intermittent Springs near Pahrump, Nev., during the period Mar. 31 to Oct. 5, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 31[a]	L. W. Jordan	1.40	25.1	July 6	A. M. Quill	0.92	7.8
Apr. 6	A. M. Quill	1.26	16.2	13	.....do	.84	6.0
13	.....do	1.32	20.4	20	.....do	.92	7.7
20	.....do	1.38	24.6	27	.....do	.84	6.0
27	.....do	1.56	35.8	Aug. 3	.....do	.84	5.8
May 4	.....do	1.51	32.9	8	.....do	.78	4.5
11	.....do	1.52	33.0	17	.....do	....	3.7
18	.....do	1.35	22.1	24	.....do	.68	2.8
25	.....do	1.26	18.4	31	.....do	.64	2.4
June 1	.....do	1.20	15.6	Sept. 7	.....do	.60	1.7
8	.....do	1.24	17.3	14	.....do	.56	1.1
15	.....do	1.22	16.7	21	.....do	.52	.76
22	.....do	1.10	12.7	28	.....do	.48	.52
29	.....do	1.00	9.9	Oct. 5	.....do	.48	.48

[a] Point of zero flow determined at gage height 0.6±.05.

Daily discharge, in second-feet, of Intermittent Springs near Pahrump, Nev., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	23	36	16	9.4	5.0	2.2	16	20	24	17	13.0	4.0	1.2
2	22	33	16	9.1	5.7	2.2	17	23	23	16	10.0	3.7	1.1
3	22	32	16	8.6	5.7	2.0	18	24	22	16	9.1	3.5	1.1
4	21	33	16	8.1	5.2	2.0	19	24	22	15	8.3	3.3	1.0
5	20	34	16	7.8	5.0	1.9	20	24	21	14	7.8	3.1	.9
6	18	35	17	7.8	5.0	1.8	21	25	20	14	7.6	3.0	.8
7	18	34	17	7.3	4.8	1.6	22	26	19	13	7.3	3.0	.8
8	18	33	18	7.1	4.8	1.5	23	28	19	12	6.6	3.0	.8
9	19	33	18	6.8	4.8	1.5	24	31	19	12	6.4	2.8	.6
10	22	33	18	6.4	4.6	1.4	25	32	18	12	6.4	2.6	.6
11	24	33	18	6.4	4.6	1.4	26	33	17	11	6.2	2.4	.6
12	22	33	18	6.2	4.4	1.3	27	36	16	11	5.9	2.5	.5
13	21	31	17	5.9	4.2	1.3	28	38	16	10	5.7	2.6	.5
14	20	29	17	5.9	4.2	1.3	29	39	16	9.9	5.2	2.5	.4
15	20	26	17	15.0	4.0	1.3	30	38	16	9.6	5.0	2.4	.4
							31	......	16	......	5.0	2.2	......

Monthly discharge of Intermittent Springs near Pahrump, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April	39	18	25.0	1,490
May	36	16	25.5	1,570
June	18	9.6	14.9	887
July	15	5.0	7.53	463
August	5.7	2.2	3.83	236
September	2.2	.4	1.20	71.4
The period	....	....	....	4,720

SALTON SINK BASIN.

SALTON SEA NEAR SALTON, CAL.

Location.—Near the mouth of Salt Creek, 1 mile west of Durmid, 2½ miles east of Salton, Riverside County, and 7 miles east of Mecca.

Records available.—November, 1904, to Sept. 30, 1916.

GAGE.[1]—Vertical staff in several sections fastened to piling. Gage is graduated to feet and inches and is inverted (reads down) with its zero at 6.1 feet above mean sea level, U. S. G. S. datum. To obtain depths subtract reading from 279.6 feet because the lowest point in bottom of Salton Sea is at 273.5 feet below mean sea level, U. S. G. S. datum. Gage is read by an employee of Southern Pacific Co. Original gage, read November 1, 1904, to February 26, 1906, was established about 3½ miles northwest of Salton by New Liverpool Salt Co. and read depths directly. First Survey gage, read March 2, 1906, to June 5, 1906, half a mile west of Salton, also read depths directly. First Southern Pacific Co.'s gage, read June 6, 1906, to July 5, 1909, was at present location with its zero at 6.8 feet above mean sea level, U. S. G. S. datum. Readings from its inverted scale, subtracted from 280.35 feet, gave depths in Salton Sea. Second Survey gage, read July 6, 1909, to April 21, 1914, at the same place, read elevations below mean sea level, U. S. G. S. datum. Readings subtracted from 273.5 feet gave depths. The present gage has been read since April 24, 1914.

EXTREMES OF DEPTH.—Maximum depth during year, 38.2 feet, October 1; minimum depth, 33.95 feet, September 29.

1904–1916: Maximum depth, 76.0 feet, February 10 to March 29, 1907; minimum depth, no water at gage November 1 to 14, 1904.

COOPERATION.—The Southern Pacific Co. has furnished the record since June 30, 1914.

Area of sea January 1, 1909, was 443 square miles.

Practically all the water now received by Salton Sea enters through Alamo and New Rivers, chiefly through the former. These rivers run through Imperial Valley and are drainage channels for excess and waste waters from the irrigation system and from the power plants. The following table shows the depth of Salton Sea:

Daily depth, in feet, of Salton Sea near Salton, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	38.2						36.8					34.6
2									36.3			
3			36.6			36.95						
4					36.95						35.35	
5		37.35						36.6				
6												
7				36.35			36.8			35.9		
8	38.0											34.45
9									36.2			
10			36.5			36.95						
11					36.95						35.1	
12		37.2						36.5				
13												
14				36.35			36.75			35.75		
15	37.85											34.25
16									36.15			
17			36.5			36.9						
18					36.95						34.95	
19		37.1						36.45				
20												
21				36.35			36.7			35.6		
22	37.7											34.1
23									36.05			
24			36.45			36.9						
25					36.95						34.75	
26		37.0						36.4				
27												
28				36.35			36.7			35.5		
29	37.5											33.95
30									36.0			
31			36.4			35.85						

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[1] History of gages previously published in water-supply papers incomplete, and some statements regarding datums erroneous.

OWENS LAKE BASIN.

OWENS RIVER NEAR ROUND VALLEY, CAL.

Location.—In SE. ¼ sec. 10, T. 6 S., R. 31 E., below Sheep Bridge, 700 feet above mouth of Rock Creek and 2 miles north of Round Valley, Inyo County.

Drainage area.—About 450 square miles.

Records available.—August 4, 1903, to September 30, 1916.

Gage.—Vertical staff on left bank 85 feet below bridge; read by W. D. Roberts. The datum differs from that of the previous gage, which was 100 feet above the present one and used prior to May 29, 1907.

Discharge measurements.—Made from cable at gage.

Channel and control.—Rock and boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 3.20 feet at 7.20 a. m. June 17 (discharge, 625 second-feet); minimum stage recorded, 1.70 feet November 28 and December 1 (discharge, 132 second-feet).

1903–1916: Maximum stage recorded, 4.0 feet June 30, 1907 (discharge, 1,190 second-feet); minimum discharge recorded, 120 second-feet September 21, 1913.

Ice.—Shore ice exists at times but ordinarily does not affect the stage-discharge relation.

Diversions.—No water is diverted above the station.

Regulation.—None.

Accuracy.—Stage-discharge relation permanent; not affected by ice during year. Rating curve fairly well defined. Gage read to hundredths about every other day. Daily discharge ascertained by applying daily gage height to rating table for days when gage was read and interpolating discharge for days between (see footnote to daily-discharge table). Records good except for the high water of June, which are fair.

Cooperation.—Gage-height and discharge-measurement records furnished by the city of Los Angeles.

Discharge measurements of Owens River near Round Valley, Cal., during the year ending Sept. 30, 1916.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 12	2.00	188	Apr. 28	2.35	290	July 28	2.55	354
Dec. 15	1.93	180	May 29	2.45	314	Aug. 25	2.20	244
Mar. 9	2.10	210	June 21	3.00	610	Sept. 25	2.11	215

Daily discharge, in second-feet, of Owens River near Round Valley, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	177	*a* 190	132	156	*a* 229	242	*a* 250	291	335	*a* 354	242	229
2	*a* 174	192	*a* 136	*a* 166	270	*a* 233	285	*a* 304	*a* 366	242	*a* 236	*a* 222
3	170	*a* 192	141	177	*a* 263	224	*a* 298	318	398	*a* 242	229	216
4	*a* 176	192	141	*a* 168	256	*a* 208	310	*a* 309	*a* 402	*a* 242	*a* 229	*a* 220
5	181	*a* 192	*a* 150	160	*a* 263	192	*a* 314	300	405	242	229	224
6	*a* 176	192	160	*a* 160	270	*a* 204	318	*a* 318	*a* 425	*a* 238	*a* 222	*a* 220
7	170	*a* 181	*a* 160	160	*a* 263	216	*a* 326	335	445	*a* 233	216	216
8	*a* 174	170	160	*a* 165	256	*a* 216	335	*a* 326	*a* 461	229	*a* 208	*a* 216
9	177	*a* 169	*a* 170	170	*a* 249	216	*a* 358	318	477	*a* 329	*a* 200	216
10	*a* 174	168	181	*a* 168	242	*a* 216	380	294	*a* 488	*a* 430	192	192
11	170	*a* 169	*a* 176	166	229	216	*a* 392	300	498	530	*a* 192	*a* 192
12	192	170	170	*a* 168	*a* 210	192	405	*a* 291	*a* 492	*a* 508	192	192
13	*a* 192	*a* 170	160	170	192	*a* 208	*a* 415	282	485	485	*a* 192	*a* 192
14	192	170	*a* 165	*a* 169	*a* 192	224	425	*a* 291	*a* 508	*a* 485	192	192
15	181	170	170	168	192	*a* 208	457	300	530	485	*a* 196	*a* 192
16	170	177	*a* 170	170	*a* 192	192	*a* 451	*a* 292	*a* 578	*a* 485	*a* 200	192
17	188	170	170	*a* 177	192	229	445	285	625	485	204	*a* 192
18	*a* 190	*a* 170	*a* 165	*a* 185	*a* 192	216	*a* 425	*a* 278	*a* 612	*a* 461	*a* 198	192
19	192	170	160	192	192	*a* 258	405	270	600	437	192	*a* 202
20	*a* 192	*a* 163	*a* 165	188	181	300	*a* 411	*a* 290	*a* 565	*a* 441	*a* 190	211
21	192	156	170	*a* 190	285	242	417	310	530	445	188	204
22	*a* 192	*a* 151	*a* 170	192	242	*a* 239	*a* 408	*a* 305	*a* 565	*a* 425	*a* 179	*a* 210
23	192	146	170	192	229	*a* 236	398	300	600	405	170	216
24	*a* 192	*a* 144	*a* 165	*a* 192	216	*a* 232	*a* 366	*a* 318	*a* 576	*a* 411	*a* 188	*a* 218
25	192	141	160	192	*a* 250	229	335	335	552	417	206	219
26	*a* 192	*a* 141	160	*a* 190	285	*a* 222	*a* 326	*a* 335	*a* 541	370	170	*a* 212
27	192	141	*a* 155	188	*a* 264	216	318	335	530	370	*a* 193	204
28	*a* 192	132	150	*a* 190	242	*a* 220	285	*a* 326	*a* 508	352	216	*a* 210
29	192	*a* 134	*a* 153	192	270	224	*a* 292	318	485	*a* 324	*a* 220	216
30	192	137	156	*a* 190	....	*a* 220	300	*a* 332	465	*a* 297	224	*a* 222
31	188	....	150	188	....	216	....	346	....	*a* 270	*a* 226	....

a No record; discharge interpolated.

Monthly discharge of Owens River near Round Valley, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	192	170	184	11,300
November	192	132	165	9,820
December	181	132	160	9,840
January	192	156	177	10,900
February	285	181	235	13,500
March	300	192	223	13,700
April	457	250	362	21,500
May	346	270	308	18,900
June	625	335	502	29,900
July	530	229	376	23,100
August	242	170	204	12,500
September	229	192	208	12,400
The year	625	132	258	187,000

OWENS RIVER NEAR BIG PINE, CAL.

LOCATION.—In sec. 2, T. 11 S., R. 34 E., at Charlies Butte, 11 miles southeast of Big Pine, Inyo County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 20, 1906, to September 30, 1916.

GAGE.—Vertical staff on left bank; read by J. E. Jones.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Sand and gravel; shifts slightly. Right bank high; left bank subject to overflow during floods.

Extremes of discharge.—Maximum stage recorded during year, 7.0 feet at 12 m. January 10 (discharge, 1,700 second-feet); minimum stage recorded, 1.2 feet September 11 to 15 and 18 (discharge, 154 second-feet).

1906–1916: Maximum stage recorded, 11.2 feet at about 9 p. m. January 26, 1914 (discharge, from extension of rating curve, about 3,220 second-feet); minimum stage recorded, —0.05 foot June 13 to 16, 1908 (discharge, 36 second-feet).

Ice.—Stage-discharge relation not affected by ice.

Diversions.—On account of diversions above the station the record does not indicate the total run-off from the drainage area.

Regulation.—Flow partly regulated by diversions.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read to half-tenths once a day, sometimes to hundredths. Daily discharge ascertained by applying daily gage height to rating table. Records excellent.

Cooperation.—Gage-height and discharge measurement records furnished by the city of Los Angeles.

Discharge measurements of Owens River near Big Pine, Cal., during the year ending Sept. 30, 1916.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 11	2.00	290	Mar. 11	3.58	607	May 27	2.15	309
Dec. 17	2.77	457	Apr. 1	3.42	625	June 17	4.20	854
Feb. 28	5.57	1,170	26	1.90	254	29	4.10	769
Mar. 7	4.01	740	May 11	2.20	329	Aug. 4	2.50	384
						22	1.60	222

Daily discharge, in second-feet, of Owens River near Big Pine, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	313	396	463	440	557	920	605	284	284	730	418	177
2	313	375	463	440	605	680	605	294	294	705	396	177
3	313	375	463	440	655	557	655	284	294	705	354	177
4	294	396	486	605	705	557	605	275	294	705	396	177
5	294	396	509	730	655	805	605	266	294	680	440	185
6	294	396	533	680	655	860	605	275	313	705	463	185
7	294	396	509	655	655	755	605	294	375	705	463	185
8	294	396	486	630	655	705	605	294	418	755	418	185
9	294	418	486	1,100	680	655	605	294	509	805	375	194
10	284	396	486	1,700	680	655	630	354	557	805	333	185
11	294	396	486	1,040	705	655	630	333	605	805	333	154
12	275	396	486	755	705	655	655	294	655	805	294	154
13	275	396	463	680	705	655	605	375	655	805	284	154
14	284	418	486	655	730	630	557	375	680	805	284	154
15	284	418	509	605	730	630	581	418	705	805	275	154
16	294	418	463	581	755	605	581	418	755	830	266	162
17	294	440	463	581	805	605	655	418	805	830	256	162
18	294	440	486	581	780	605	557	440	860	830	238	154
19	294	440	486	630	805	605	509	418	920	755	220	169
20	313	463	463	655	950	605	440	396	1,040	730	229	177
21	294	463	463	605	1,100	630	375	396	950	705	220	169
22	294	463	486	605	1,380	705	375	396	920	705	220	185
23	294	463	509	630	1,490	680	354	396	860	655	211	194
24	294	463	486	630	1,320	655	313	375	755	705	185	169
25	333	463	486	655	1,250	605	294	354	705	705	185	177
26	354	440	486	630	1,160	605	275	333	755	730	185	194
27	354	463	463	655	1,280	605	275	333	755	730	177	202
28	375	440	463	655	1,250	605	294	333	780	605	177	220
29	375	463	463	630	1,040	605	275	313	780	557	177	238
30	375	463	509	533	......	605	275	313	755	509	177	256
31	375	......	440	533	......	630	......	294	......	463	177	......

Monthly discharge of Owens River near Big Pine, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	375	275	310	19.100
November	463	375	425	25,300
December	533	440	482	29,600
January	1,700	440	676	41,600
February	1,490	557	877	50,400
March	920	557	656	40,300
April	655	275	500	29,800
May	440	266	343	21,100
June	1,040	284	644	38.300
July	830	463	722	44,400
August	463	177	285	17,500
September	256	154	181	10,800
The year	1,700	154	507	368,000

OWENS RIVER NEAR LONE PINE, CAL.

LOCATION.—In NW. ¼ sec. 23, T. 15 S., R. 36 E., at Mount Whitney highway bridge, about 2½ miles northeast of Lone Pine, Inyo County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 1, 1909, to September 30, 1916.

GAGE.—Vertical staff fastened to a pile in channel at downstream side of bridge; read by G. F. Marsh. The high water, January 27–29, 1914, raised the pier to which gage was fastened 1.83 feet. Gage has not been reset.

DISCHARGE MEASUREMENTS.—Made by wading or from cable about 1,000 feet below bridge.

CHANNEL AND CONTROL.—Sandy; fairly permanent. One channel at low stages; three or more during floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.95 feet on morning of February 25 (discharge, 1,390 second-feet); minimum stage recorded, 1.3 feet September 28 to 30 (discharge, 4 second-feet).

1909-1916: Maximum stage recorded, 10.6 feet July 7, 1909 (discharge, 2,050 second-feet); minimum stage recorded September 28 to 30, 1916.

ICE.—Shore ice sometimes forms at the station during very cold weather but probably does not affect the stage-discharge relation.

DIVERSIONS.—Record does not show total run-off from drainage area on account of diversions above station. The Los Angeles Aqueduct, which has its intake above the station, was formally opened February 13, 1913.

REGULATION.—Flow is partly regulated by the diversions above.

ACCURACY.—Stage-discharge relation changed slightly twice during year from caving of banks. Changes probably occurred December 8 and March 7. Rating curves for first and second periods, well defined; for third period well defined above 200 second-feet. Gage read to half-tenths once a day. Daily discharge ascertained by applying daily gage height to rating table. Records very good except for extreme low water in September which are probably fair.

COOPERATION.—Gage-height and discharge measurement records furnished by the city of Los Angeles.

Discharge measurements of Owens River near Lone Pine, Cal., during the year ending Sept. 30, 1916.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
1908.	*Feet.*	*Sec.-ft.*	1909.	*Feet.*	*Sec.-ft.*	1911.	*Feet.*	*Sec.-ft.*
Oct. 6	3.35	216	Mar. 6	6.50	788	June 16	5.90	678
Dec. 21	4.74	408	21	5.30	542	Aug. 3	3.55	222
Feb. 18	6.70	832	May 4	3.90	300	31	2.45	78

Daily discharge, in second-feet, of Owens River near Lone Pine, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	203	349	459	292	520	1,120	619	166	255	495	375	86
2	210	349	459	310	500	1,100	597	180	270	300	375	86
3	218	366	459	460	582	1,070	619	225	270	270	375	80
4	218	366	459	500	670	1,050	619	270	270	300	300	80
5	218	384	459	604	692	670	619	270	240	355	240	61
6	218	384	459	648	692	648	597	270	240	415	225	53
7	210	384	479	692	738	906	495	285	285	435	210	45
8	210	384	499	762	810	817	495	285	300	455	210	37
9	210	384	440	786	786	707	495	300	355	455	210	30
10	210	384	420	834	786	707	495	300	395	495	210	23
11	210	384	420	882	762	685	300	300	415	535	202	23
12	210	402	400	906	762	641	255	300	435	597	202	17
13	218	421	382	1,000	762	641	285	300	435	575	202	17
14	218	421	382	906	762	641	415	300	455	575	202	14
15	218	421	382	762	786	619	597	300	535	575	152	12
16	218	421	382	762	810	619	619	300	685	597	145	12
17	218	421	364	762	810	619	395	300	707	597	108	12
18	218	421	346	738	858	619	210	335	773	597	102	12
19	218	421	292	714	858	619	166	315	817	619	102	10
20	218	440	420	738	882	597	152	315	839	619	96	10
21	226	440	420	762	906	555	152	255	883	619	91	8.0
22	218	440	400	714	1,150	555	225	210	883	619	91	8.0
23	218	440	400	670	1,190	555	210	126	905	619	91	8.0
24	218	440	382	670	1,270	575	225	202	930	619	91	8.0
25	218	440	382	670	1,400	575	225	195	930	575	91	8.0
26	218	440	382	648	1,300	575	210	285	861	575	86	6.0
27	218	440	382	520	1,220	575	180	270	751	555	86	6.0
28	281	440	382	460	1,150	555	173	270	729	535	86	4.0
29	298	459	364	274	1,120	555	166	240	663	495	86	4.0
30	332	459	364	274	......	555	166	240	663	455	80	4.0
31	332	......	346	382	......	575	......	240	......	415	82	......

Monthly discharge of Owens River near Lone Pine, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	332	203	228	14,000
November	459	349	412	24,500
December	499	292	405	24,900
January	1,000	274	648	39,800
February	1,400	500	880	50,600
March	1,120	555	687	42,200
April	619	152	366	21,800
May	335	126	263	16,200
June	930	240	572	34,000
July	619	270	514	31,600
August	375	80	168	10,300
September	86	4.0	26.1	1,550
The year	1,400	4.0	429	311,000

OWENS LAKE NEAR LONE PINE,[1] CAL.

Location.—On west shore of Owens Lake, 1 mile north of Brier siding on California & Nevada Railroad (Southern Pacific Co.), and about 9 miles south of Lone Pine, Inyo County.

Records available.—March, 1908, to September 30, 1916.

Gage.—Vertical staff, installed November 1, 1911, at a boulder point east of railroad culvert No. 507B; read when weather conditions permit accurate observations, by an employee of the city of Los Angeles. Original gage, a vertical staff near the old Smith ranch, was submerged in July, 1911, whereupon an upper section was installed. Gage datum before July 29, 1913, 3,564.90 feet above sea level, U. S. G. S. datum; after that date, 3,561.90 feet. January 12, 1915, gage was washed out but was replaced at same location and datum.

Extreme of stage.—1911–1916: Maximum stage recorded, 8.75 feet March 16 and April 7, 1912; minimum stage recorded, 4.3 feet November 22 and December 4, 1913.

Cooperation.—Record of elevations furnished by city of Los Angeles.

Elevations given in table are computed from original reading made on gage, the datum of which is stated in paragraph headed "gage." To reduce these elevations to mean sea level (U. S. G. S. datum), add 3,570 feet.

Elevation of water surface, in feet, of Owens Lake near Lone Pine, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1								8.35	8.00		7.95	
2	6.10		5.92		7.05	7.90						
3							8.35			8.00	7.95	
4	6.00							8.35				
5	5.90				7.10			8.40	8.00			7.35
6	6.00		6.00	6.20						8.00		
7					7.20		8.40				7.85	
8												7.30
9	6.00					8.15						
10			6.00	6.40			8.40			8.05	7.80	
11					7.30			8.30				
12	5.90								8.00			7.15
13						8.20	8.40		8.03			
14		5.70	6.00		7.38						7.75	7.10
15								8.20	8.00			
16	5.80		6.05	6.60		8.25						
17							8.40			8.05	7.60	
18	5.80	5.75										7.05
19								8.20	8.00			
20						8.30				8.05		
21			6.10		7.60		8.40				7.50	
22	5.90		6.10	6.80				8.20	8.05			7.00
23		5.88			7.65							
24			6.12	6.85		8.30				8.05	7.50	
25	5.90	5.88			7.65		8.40	8.20				7.00
26									8.00			
27			6.13			8.30				8.00		
28				7.00	7.80		8.40				7.50	
29					7.85			8.10				6.90
30	5.90	5.92	6.15			8.35			8.00			
31											7.45	

ROCK CREEK NEAR ROUND VALLEY, CAL.

Location.—In NE. ¼ SE. ¼ sec. 9, T. 6 N., R. 31 E., below highway bridge a short distance above mouth of Pine Creek, 2 miles northwest of Round Valley, Inyo County.

Drainage area.—About 46 square miles.

Records available.—August 3, 1903, to September 30, 1916.

Gage.—Vertical staff on left bank about 600 feet below bridge; read by W. D. Roberts. Prior to July, 1906, gage was at highway bridge.

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[1] Formerly known as "near Olancha."

Discharge measurements.—Made from footbridge at gage or by wading.

Channel and control.—Sand and cobblestones; somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year, 2.78 feet at 2.30 p. m. June 19 (discharge, 157 second-feet); minimum stage recorded, 1.23 feet at 8 a. m. November 10 (discharge, 27 second-feet).

1903–1916: Maximum stage recorded, 5.0 feet January 25, 1914 (discharge, 360 second-feet); minimum stage recorded, 1.0 foot April 20 to 23, 1905 (discharge, 14 second-feet).

Ice.—Shore ice forms at times but probably does not affect stage-discharge relation.

Diversions.—Water for irrigation is diverted above the station.

Regulation.—Flow partly regulated by diversions.

Accuracy.—Stage-discharge relation changed frequently. Rating curves used December 10 to February 21, fairly well defined; February 22 to May 13 well defined; May 14 to June 19 and June 20 to July 13, fairly well defined. Gage read to hundredths about every other day. Daily discharge ascertained by applying daily gage height to rating table and interpolating discharge for days when gage was not read; shifting-control method used October 1 to December 9 and July 14 to September 20. Records fair.

Cooperation.—Gage-height and discharge measurement records furnished by the city of Los Angeles.

Discharge measurements of Rock Creek near Round Valley, Cal., during the year ending Sept. 30, 1916.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 12	1.28	31	Apr. 28	1.40	38	July 28	1.65	66
Dec. 15	1.35	31	May 29	1.75	69	Aug. 27	1.45	47
Mar. 9	1.45	42	June 21	2.30	105	Sept. 25	1.20	30
23	1.40	38						

Daily discharge, in second-feet, of Rock Creek near Round Valley, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	36	[a] 30	30	38	[a] 52	52	[a] 40	45	80	[a] 65	55	47
2	[a] 33	31	[a] 31	[a] 54	52	[a] 47	42	[a] 50	[a] 90	58	[a] 52	[a] 49
3	30	[a] 31	32	70	[a] 48	42	[a] 44	54	100	[a] 60	48	51
4	[a] 32	31	30	[a] 59	44	[a] 42	45	[a] 55	[a] 102	[a] 63	[a] 46	[a] 49
5	33	[a] 31	[a] 32	48	[a] 46	42	[a] 46	56	105	65	44	47
6	[a] 32	31	33	[a] 46	48	[a] 44	47	[a] 58	[a] 116	[a] 60	[a] 46	[a] 45
7	31	[a] 31	[a] 34	43	[a] 44	45	[a] 46	59	128	[a] 56	47	43
8	[a] 32	31	34	[a] 42	41	[a] 44	45	[a] 58	[a] 126	51	[a] 46	[a] 43
9	34	[a] 29	[a] 34	41	[a] 41	42	[a] 42	56	123	[a] 63	[a] 44	43
10	[a] 34	27	35	[a] 40	41	[a] 44	39	63	[a] 124	[a] 76	43	43
11	34	[a] 30	[a] 35	38	38	45	[a] 38	67	124	88	[a] 43	[a] 43
12	31	33	35	[a] 38	[a] 38	39	36	[a] 68	[a] 126	[a] 96	43	43
13	[a] 32	[a] 32	35	38	37	[a] 40	[a] 38	69	128	105	[a] 44	[a] 43
14	32	31	[a] 34	[a] 38	[a] 36	42	39	[a] 70	[a] 130	[a] 106	46	43
15	32	[a] 32	34	37	35	[a] 40	33	72	132	107	[a] 46	[a] 44
16	32	34	[a] 34	47	[a] 35	39	[a] 35	[a] 70	[a] 143	[a] 99	[a] 45	44
17	34	31	35	48	35	40	37	67	154	91	45	[a] 43
18	[a] 33	[a] 32	[a] 33	52	[a] 38	39	[a] 35	[a] 62	[a] 156	[a] 84	[a] 44	42
19	32	33	31	[a] 52	41	[a] 46	33	58	157	77	42	[a] 43
20	[a] 32	[a] 32	[a] 32	52	38	52	[a] 36	[a] 62	[a] 131	[a] 78	[a] 44	44
21	32	32	34	55	112	45	40	67	105	79	45	42
22	[a] 32	[a] 31	[a] 34	[a] 54	59	[a] 42	[a] 40	[a] 66	[a] 107	[a] 74	[a] 45	[a] 39
23	32	30	35	52	56	39	39	65	109	68	45	36
24	[a] 32	[a] 30	[a] 34	[a] 54	52	[a] 40	[a] 40	[a] 68	[a] 110	[a] 70	[a] 47	[a] 33
25	33	30	32	55	[a] 66	40	42	72	110	73	49	30
26	[a] 32	[a] 30	34	[a] 52	79	[a] 41	[a] 44	[a] 74	[a] 102	68	51	[a] 34
27	31	30	[a] 34	50	[a] 69	42	45	76	94	68	48	37
28	[a] 31	31	34	[a] 52	59	[a] 41	39	[a] 72	[a] 87	66	51	[a] 35
29	31	[a] 31	[a] 33	55	56	40	[a] 42	68	80	[a] 68	[a] 51	33
30	33	31	32	[a] 54	......	[a] 40	45	[a] 72	72	69	51	[a] 41
31	30	......	32	52	......	39	......	76	......	[a] 62	[a] 49	......

[a] No records; discharge interpolated.

Monthly discharge of Rock Creek near Round Valley, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	36	30	32.3	1,990
November	34	27	31.0	1,840
December	35	30	33.3	2,050
January	70	37	48.6	2,990
February	112	35	49.5	2,850
March	52	39	42.4	2,610
April	47	33	40.4	2,400
May	76	45	64.4	3,960
June	157	72	115.0	6,840
July	107	51	74.6	4,590
August	55	42	46.6	2,870
September	51	30	41.7	2,480
The year	157	27	51.6	37,500

PINE CREEK NEAR ROUND VALLEY, CAL.

Location.—In NE. ¼ SE. ¼ sec. 9, T. 6 S., R. 31 E., 300 feet above highway bridge, about 600 feet above junction with Rock Creek, and 2 miles northwest of Round Valley, Inyo County.

Drainage area.—About 32 square miles above mouth of canyon.

Records available.—August 3, 1903, to September 30, 1916.

Gage.—Vertical staff on left bank, 300 feet above bridge; read by W. D. Roberts. Prior to May 13, 1908, gage was 150 feet below highway bridge.

Discharge measurements.—Made from footbridge at gage or by wading.

Channel and control.—Lava rock and sand; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 6.0 feet at 2.10 p. m. June 19 (discharge, 244 second-feet); minimum stage recorded, 3.30 feet November 27, 28, 30, December 1 and 4 (discharge, 0.7 second-foot).

1903-1916: Maximum discharge recorded, 370 second-feet June 22, 1911; minimum stage recorded, 3.2 feet June 15, 1913 (discharge, 0.2 second-foot).

Ice.—Ice occasionally forms along shores at station, but it has never been known to have affected the stage-discharge relation.

Diversions.—Water is diverted above station for irrigation.

Regulation.—Probably diversions partly regulate the flow.

Accuracy.—Stage-discharge relation practically permanent. Rating curve fairly well defined. Gage read to hundredths about every other day. Daily discharge ascertained by applying gage height to rating table and interpolating discharge for days when gage was not read. (See footnote to daily-discharge table). Records fair.

Cooperation.—Gage-height and discharge measurement records furnished by the city of Los Angeles.

Discharge measurements of Pine Creek near Round Valley, Cal., during the year ending Sept. 30, 1916.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 12	3.60	5.4	Apr. 28	3.80	13.7	July 28	4.40	52
Dec. 15	3.62	6.2	May 29	3.88	16.2	Aug. 27	3.55	5.1
Mar. 9	3.62	6.6	June 21	5.05	120	Sept 25	3.60	5.8
23	3.62	6.7						

Daily discharge, in second-feet, of Pine Creek near Round Valley, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.5	[a]3.2	0.7	4.5	[a]7.4	9.0	[a]4.5	12	24	[a]54	38	5.8
2	[a]1.5	3.2	[a].9	[a]11	9.0	[a]9.0	5.8	[a]13	[a]29	62	[a]20	[a]5.8
3	1.5	[a]3.8	1.1	18	[a]9.0	9.0	[a]5.8	14	34	[a]49	1.1	5.8
4	[a]1.8	4.5	.7	[a]12	9.0	[a]9.0	5.8	[a]16	[a]36	[a]37	[a]1.1	[a]5.2
5	2.0	[a]5.2	[a]1.6	5.8	[a]10	9.0	[a]5.8	18	38	24	1.1	4.5
6	[a]1.8	5.8	2.4	[a]4.5	11	[a]10	5.8	[a]18	[a]44	[a]23	[a]5.0	[a]5.2
7	1.5	[a]4.5	[a]3.4	3.2	[a]10	11	[a]6.3	18	51	[a]22	9.0	5.8
8	[a]1.5	3.2	4.5	[a]3.2	9.0	[a]8.7	6.8	[a]16	[a]52	21	[a]7.1	[a]5.8
9	1.5	[a]2.4	[a]5.2	3.2	[a]9.5	6.4	[a]7.9	13	53	[a]67	[a]5.1	5.8
10	[a]1.4	1.5	5.8	[a]3.2	10	[a]7.7	9.0	20	[a]68	[a]113	3.2	9.0
11	1.3	[a]1.8	[a]5.2	3.2	9.0	9.0	[a]10	24	84	160	[a]2.4	[a]9.0
12	5.8	2.0	4.5	[a]3.8	[a]10	5.8	11	[a]27	[a]90	[a]154	1.5	9.0
13	[a]5.8	[a]1.8	4.5	4.5	11	[a]5.2	[a]10	30	96	148	[a]1.5	[a]7.4
14	5.8	1.5	[a]3.8	[a]3.8	[a]10	4.5	9.0	[a]27	[a]110	[a]157	1.5	5.8
15	4.5	[a]2.0	3.2	3.2	9.0	[a]3.8	10	24	124	166	[a]4.0	[a]5.8
16	3.2	2.4	[a]4.2	4.5	[a]9.0	3.2	[a]9.5	[a]27	[a]154	[a]163	[a]6.5	5.8
17	5.8	1.5	5.3	5.8	9.0	2.4	9.0	30	183	160	9.0	[a]5.8
18	[a]5.2	[a]1.8	[a]4.9	5.8	[a]10	1.5	[a]7.9	[a]24	[a]214	[a]136	[a]7.4	5.8
19	4.5	2.0	4.5	[a]5.8	11	[a]5.2	6.8	18	244	113	5.8	[a]5.8
20	[a]5.2	[a]1.8	[a]5.2	5.8	9.0	9.0	[a]7.9	[a]18	[a]181	[a]113	[a]5.8	5.8
21	5.8	1.5	5.8	6.8	24	3.2	9.0	18	118	113	5.8	5.8
22	[a]5.8	[a]1.4	[a]5.6	[a]6.3	18	[a]4.8	[a]7.4	[a]16	[a]124	[a]104	[a]4.9	[a]5.8
23	5.8	1.2	5.3	5.8	18	6.4	5.8	14	130	84	4.0	5.8
24	[a]6.3	[a]1.1	[a]5.6	[a]6.6	13	[a]5.8	[a]7.9	[a]14	[a]133	[a]86	[a]4.2	[a]5.8
25	6.8	1.0	5.8	7.4	[a]18	5.3	10	13	136	87	4.5	5.8
26	[a]6.3	[a].8	4.5	[a]7.1	24	[a]4.2	[a]9.5	[a]11	130	58	5.8	[a]5.8
27	5.8	.7	[a]4.5	6.8	[a]18	3.2	9.0	9.0	124	62	4.5	5.8
28	[a]5.8	.7	4.5	[a]6.3	13	[a]3.2	13	[a]13	[a]96	53	5.8	[a]5.8
29	5.8	[a].7	[a]3.8	5.8	13	3.2	[a]12	17	69	[a]49	[a]7.4	5.8
30	4.5	.7	3.2	[a]5.8	......	[a]3.2	11	[a]19	45	[a]46	9.0	[a]5.8
31	3.2	......	3.2	5.8	......	3.2	......	21	......	[a]42	[a]7.4	......

[a] No record; discharge interpolated.

Monthly discharge of Pine Creek near Round Valley, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	6.8	1.3	4.03	248
November	5.8	.7	2.19	130
December	5.8	.7	3.98	245
January	18	3.2	5.98	368
February	24	7.4	12.1	696
March	11	1.5	5.94	365
April	13	4.5	8.31	494
May	30	9.0	18.5	1,140
June	244	24	100	5,950
July	166	21	87.9	5,400
August	38	1.1	6.43	395
September	9.0	4.5	6.09	362
The year	244	.7	21.8	15,800

MONO LAKE BASIN.

MONO LAKE NEAR MONO LAKE, CAL.

Location.—In lot 6, SE. ¼ NE. ¼ sec. 31, T. 2 N., R. 20 E., about 2 miles south of Mono Lake post office, Mono County.

Records available.—June 15, 1912 to September 30, 1916 (fragmentary).

Gage.—Vertical staff fastened to willow tree about 400 feet from Hammon's store; temporary gage at different datum about 300 feet northwest of old gage was used during 1916. Read by Tyler and Green.

Extremes of stage.—1912–1916: Maximum stage recorded, 13.3 feet May 27, 1915; minimum stage recorded, 7.93 feet December 11, 1913.

Cooperation.—The following gage-height record was furnished by United States Forest Service. July 13, 2.0 feet; August 23, 1.8 feet; September 28, 1.5 feet.

LEEVINING CREEK NEAR MONO LAKE, CAL.

Location.—In SE. ¼ SE. ¼ sec. 17, T. 1 N., R. 26 E., at ranger station in Mono National Forest about 3¼ miles above mouth, 4 miles south of Mono Lake post office, Mono County.

Drainage area.—Not measured.

Records available.—November 17, 1910, to September 30, 1916 (fragmentary), when the station was discontinued.

Gage.—Vertical staff fastened to cottonwood tree on left bank, 250 feet below ranger station; read by J. B. Anderson.

Discharge measurements.—Made by wading near gage.

Channel and control.—Gravel; practically permanent.

Extremes of discharge.—Maximum stage recorded during year, 3.9 feet at 10 a. m. June 19 (discharge, 326 second-feet); minimum stage recorded, 2.3 feet, April 3, September 25 and 28 (discharge, 29 second-feet).

1910–1916: Maximum stage recorded, 4.9 feet June 19, 1911 (discharge, 750 second-feet); minimum stage recorded, 2.04 feet March 2, 1912 (discharge, 12 second-feet).

Ice.—Stage-discharge relation affected by ice.

Diversions.—Less than 100 acres are irrigated from this stream above the station.

Regulation.—None.

Accuracy.—Stage-discharge relation probably permanent but has not been verified by discharge measurements since 1914. Rating curve well defined above 80 second-feet and fairly well defined below. Gage read to half-tenths occasionally. Discharge ascertained by applying gage height to rating table.

Cooperation.—Gage-height record furnished by United States Forest Service.

Daily discharge, in second-feet, of Leevining Creek near Mono Lake, Cal., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1		90					16						39
2				200			17	62					
3	29			200			18						
4							19			326	200		
5			140		105		20						
6						50	21					62	
7					105		22		140				
8		122					23				200		
9							24	75					
10	50			270			25						29
11						44	26			270			
12			245				27						
13							28						29
14							29		105		122		
15		122			68		30					56	
							31						

WALKER LAKE BASIN.

EAST WALKER RIVER NEAR MASON, NEV.

LOCATION.—In sec. 26, T. 12 N., R. 25 E., at highway bridge 2½ miles above junction with West Walker River and 7 miles above Mason, Lyon County.

DRAINAGE AREA.—1,230 square miles.

RECORDS AVAILABLE.—November 21, 1910, to September 15, 1912; July 5, 1913, to September 30, 1916. From 1902 to 1908 a station was maintained at Ross ranch, a short distance above present station.

GAGE.—Inclined staff on left bank 50 feet below highway bridge, August 1, 1914, to September 30, 1916; inspected by Mrs. J. H. Hilburn. Original gage, vertical staff on left bank, November 21, 1910, to September 15, 1912, and July 5, 1913, to September 30, 1913; inclined staff on right bank at 0.31 foot lower datum, October 1, 1913, to June 22, 1914; temporary staff gage on left bank 25 feet below highway bridge, July 1 to July 31, 1914.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge 50 feet above gage.

CHANNEL AND CONTROL.—Bed composed of loose sand. Banks cave at high stages. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.2 feet March 29 (discharge, 528 second-feet); minimum stage, 0.90 foot, October 10–13, 19–21, and 26–30 (discharge, 29 second-feet).

1910–1916: Maximum stage recorded, 8.3 feet January 26, 1914 (discharge, 1,470 second-feet); minimum stage, 1.6 feet August 6, 1913 (discharge, zero).

ICE. Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—Water to irrigate about 10,000 acres is diverted above the station.

REGULATION.—Only by irrigation diversions.

ACCURACY.—Stage-discharge relation not permanent; affected by ice January 13–29. Standard rating curve based on 1915 measurements fairly well defined; other curves used for 1916, each parallel to standard curve and rather indefinite, drawn through measurements. Gage read to half tenths once daily. Daily discharge determined by applying daily gage height to rating tables except for periods when stage-discharge relation was affected by shifting control or ice. Records poor.

Discharge measurements of East Walker River near Mason, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 17	1.30	96	Mar. 17	4.06	271	Aug. 19	1.03	33.4
Jan. 14	[a]1.89	109	June 9	2.70	208	19	[b]1.11	112

[a] Shore ice below gage.

[b] Measurement made at upper station.

Daily discharge, in second-feet, of East Walker River near Mason, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	41	35	79	58	63	221	480	390	174	361	101	60
2	41	35	80	56	82	203	441	413	174	361	89	69
3	41	35	81	47	103	186	402	413	191	361	89	69
4	41	35	82	39	113	169	386	390	191	361	89	69
5	35	35	83	38	184	154	370	367	191	361	89	69
6	35	35	84	37	181	154	354	346	191	361	79	60
7	35	35	85	57	179	140	339	325	209	361	79	60
8	35	35	97	65	193	140	346	325	209	339	69	60
9	35	35	98	148	227	140	352	284	200	318	60	51
10	29	42	100	121	262	154	337	264	227	318	51	51
11	29	42	101	121	221	169	344	227	227	318	44	51
12	29	43	114	108	169	169	350	209	245	298	37	51
13	29	51	116	108	169	212	335	209	264	298	31	51
14	35	52	117	109	169	221	342	227	270	298	31	44
15	35	53	118	....	154	240	327	227	296	278	31	44
16	35	62	120	....	154	259	312	227	323	240	31	44
17	35	63	96	....	169	278	298	227	350	240	31	37
18	35	65	94	....	169	298	284	209	379	259	31	37
19	29	66	92	....	169	339	270	209	406	240	33	31
20	29	77	89	....	169	383	276	209	383	221	31	31
21	29	78	87	....	154	452	262	191	361	203	31	31
22	35	79	86	....	169	475	268	191	339	203	37	37
23	35	80	84	....	169	498	274	191	318	203	37	37
24	35	81	82	....	186	429	280	191	318	203	44	37
25	35	82	80	....	186	383	288	191	298	186	44	31
26	29	73	78	....	186	339	312	191	318	169	51	31
27	29	74	77	....	203	318	318	191	339	154	51	31
28	29	75	75	....	203	452	325	191	361	126	51	37
29	29	77	73	....	221	528	352	191	361	113	51	37
30	29	78	61	56	....	512	381	191	361	101	51	44
31	35	....	60	56	....	496	....	174	....	101	60	....

NOTE.—Discharge determined as follows: Oct. 1 to Nov. 9 and Jan. 9–31, from a rating curve fairly well defined between 0 and 200 second-feet, taken as standard shape; Feb. 11 to Mar. 28, May 1 to June 13, and June 20 to Sept. 30, from three different curves, each parallel to standard curve; Dec. 17 and Jan. 14, from discharge measurements; Nov. 10 to Dec. 16, Dec. 18 to Jan. 8, Feb. 1–10, Mar. 29 to Apr. 30, and June 14–19, by shifting-control method. Discharge interpolated, because of ice, Jan. 15–29, 82 second-feet.

Monthly discharge of East Walker River near Mason, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	41	29	33.5	2,060
November	82	35	56.9	3,390
December	120	60	89.3	5,490
January	148	37	79.2	4,870
February	262	63	172	9,890
March	528	140	294	18,100
April	480	262	334	19,900
May	413	174	251	15,400
June	406	174	282	16,800
July	361	101	257	15,800
August	101	31	52.7	3,240
September	69	31	46.4	2,760
The year	528	29	162	118,000

WALKER RIVER AT MASON, NEV.

LOCATION.—In sec. 33, T. 13 N., R. 25 E., at highway bridge at Mason, Lyon County, about 4½ miles below junction of East Walker and West Walker rivers.

DRAINAGE AREA.—2,370 square miles.

RECORDS AVAILABLE.—November 21, 1910, to September 15, 1912; July 3, 1913, to September 30, 1916, when station was discontinued.

GAGE.—Vertical staff fastened to downstream pile of second bent from right end of bridge; read by H. C. Hansen.

DISCHARGE MEASUREMENTS.—Made from bridge at gage.

CHANNEL AND CONTROL.—Bed composed of loose sand; control is rock and brush diversion dam about 400 feet downstream from gage; small canal heads just above right end of dam; occasional changes in dam affect stage-discharge relation. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 7.48 feet June 18 and 19 (discharge, 1,850 second-feet); minimum stage, 4.30 feet September 20–25 (discharge, 36 second-feet). 1910–1916: Maximum stage recorded, 8.85 feet June 21–22, 1914 (discharge, 3,410 second-feet); minimum stage, 2.8 feet May 3–7, 1912 (discharge, 25 second-feet).

Ice.—Stage-discharge relation slightly affected by ice.

Diversions.—A large part of the flow of the East and West Walker rivers is diverted for irrigation.

Regulation.—Flow affected by irrigation diversions.

Accuracy.—Stage-discharge relation not permanent; affected by ice January 20 to February 6. Standard rating curve fairly well defined between 250 and 1,500 second-feet; curves drawn parallel to it to fit the shifting conditions during year. Gage read to half tenths twice daily. Daily discharge determined by applying mean daily-gage height to rating tables except for periods when stage-discharge relation was affected by shifting control or ice. Records fair.

Discharge measurements of Walker River at Mason, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 17	5.00	253	Mar. 17	5.50	530	Aug. 19	4.60	69
Jan. 14	[a] 4.99	263	June 10	6.95	1,470			

[a] Slight shore ice.

Daily discharge, in second-feet, of Walker River at Mason, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	69	148	178	194	......	354	828	1,020	691	1,020	194	69
2	69	138	180	194	......	326	742	989	638	1,050	158	69
3	68	140	180	202	......	295	686	957	664	1,070	144	63
4	68	140	197	233	......	301	686	926	675	1,020	......	63
5	72	142	225	233	......	326	742	1,060	747	989	......	57
6	72	142	233	214	......	310	713	1,120	834	1,070	......	57
7	73	144	250	190	415	295	686	1,170	1,010	1,020	......	57
8	73	154	250	185	419	295	686	1,090	1,160	1,050	......	57
9	74	156	253	230	432	295	713	926	1,190	1,120	......	57
10	81	146	253	236	527	301	799	864	1,420	1,050	......	52
11	89	148	239	239	648	368	951	834	1,430	970	......	52
12	89	148	239	225	736	407	1,100	804	1,450	957	......	52
13	90	148	225	217	606	432	864	730	1,500	944	......	52
14	98	150	239	233	532	462	764	719	1,500	957	......	52
15	99	167	267	239	484	484	719	719	1,450	895	......	52
16	107	169	282	239	476	508	804	719	1,580	804	......	52
17	112	152	253	239	440	541	775	747	1,700	719	......	46
18	117	165	239	239	440	591	804	719	1,850	638	......	44
19	119	165	239	239	440	675	787	747	1,850	612	69	41
20	127	167	253	235	440	752	719	747	1,520	571	69	36
21	129	178	253	230	419	858	719	719	1,360	489	69	36
22	129	185	253	220	476	888	719	775	1,120	466	69	36
23	129	204	256	215	432	919	775	834	989	458	67	36
24	131	207	256	220	399	919	895	822	1,010	476	63	36
25	131	194	256	230	354	799	895	764	1,160	458	59	36
26	142	197	241	230	361	713	895	691	1,190	433	63	41
27	142	185	230	225	392	741	957	586	1,260	376	63	41
28	142	187	217	220	399	828	989	551	1,290	320	69	46
29	142	176	204	222	399	951	989	612	1,260	267	69	46
30	156	178	204	220	......	1,020	1,070	638	1,170	239	69	46
31	156	......	204	220	......	951	......	719	......	212	72	......

Note.—Daily discharge determined from a series of parallel curves used as follows: Dec. 9–22, Jan. 11–19, Feb. 13 to Apr. 12, Apr. 13 to Aug. 3, and Aug. 19 to Sept. 30. Shifting control-method used Oct. 1 to Dec. 8, Dec. 23 to Jan. 10, and Feb. 7–12. Daily discharge estimated from weather records and by comparison with a composite hydrograph for the stations on East Walker near Mason and West Walker at Hudson Jan. 20–31. Mean discharge Feb. 1–6 estimated 320 second-feet; mean discharge Aug. 4–18 interpolated, 106 second-feet.

Monthly discharge of Walker River at Mason, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	156	68	106	6,520
November	207	138	164	9,760
December	282	178	234	14,400
January	239	185	223	13,700
February	736	....	434	25,000
March	1,020	295	578	35,500
April	1,100	686	816	48,600
May	1,170	551	817	50,200
June	1,850	638	1,220	72,600
July	1,120	212	733	45,100
August	194	59	95.4	5,870
September	69	36	49.3	2,930
The year	1,850	36	455	330,000

WALKER RIVER AT SCHURZ, NEV.

LOCATION.—In sec. 36, T. 13 N., R. 28 E., at highway bridge at Schurz, Mineral County, 3 miles above Walker Lake and 6 miles below diversion dam of Walker River Indian Reservation.

DRAINAGE AREA.—2,850 square miles.

RECORDS AVAILABLE.—July 2, 1913, to September 30, 1916.

GAGE.—Vertical staff on downstream pile of left abutment of highway bridge, about 300 feet from depot, August 4, 1914, to September 30, 1916; read by Joe Mencacci. Original gage, vertical staff fastened to tree on right bank about one-fourth mile above bridge, July 2, 1913, to July 1, 1914, when it was washed out by flood. Present gage at different datum.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge.

CHANNEL AND CONTROL.—Bed composed of loose sand; shifts occasionally. Banks cave at high stages. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.50 feet at 7 p. m. June 20 (discharge, 1,500 second-feet); minimum stage, 2.20 feet September 12–21, 23–26, and 30 (discharge, 1 second-foot).

1913–1916: Maximum stage recorded, 11.0 feet June 8 and 9, 1914 (discharge, 2,530 second-feet); minimum stage, 1.60 feet August 17–30, September 23 to October 18, 1913 (discharge, zero).

ICE.—Stage-discharge relation affected by ice; flow estimated from observer's notes and United States Weather Bureau reports from Yerington, Nev.

DIVERSIONS.—Below all diversions.

REGULATION.—Flow affected by irrigation diversions above.

ACCURACY.—Stage-discharge relation not permanent; affected by ice January 20 to February 3. Rating curves fairly well defined for ranges of stage occurring during periods for which they were applicable. Gage read to half-tenths twice daily. Daily discharge determined by applying mean daily gage heights to rating tables except during periods when stage-discharge relation was affected by ice or shifting control. Records fair.

Discharge measurements of Walker River at Schurz, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 18	4.13	241	June 10	6.15	919
Mar. 18	5.18	495	Aug. 20	2.35	3.9

Daily discharge, in second-feet, of Walker River at Schurz, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4	64	153	289	......	472	983	900	500	983	167	3
2	4	64	153	250	......	472	900	900	500	900	152	3
3	4	64	167	250	......	325	900	820	472	941	132	3
4	4	64	167	250	304	304	820	860	472	941	114	3
5	4	64	167	198	347	304	666	860	472	983	102	3
6	4	64	182	182	472	325	666	900	472	941	67	3
7	4	64	190	198	500	325	704	900	472	941	54	2
8	4	64	198	215	529	325	666	983	500	900	32	3
9	4	64	206	215	593	347	704	941	820	900	14	3
10	6	64	215	215	666	304	666	820	860	983	10	3
11	13	64	215	215	704	304	666	781	983	941	10	3
12	18	64	215	215	742	325	704	742	1,070	820	5	1
13	26	64	215	206	666	370	781	704	1,160	820	10	1
14	34	64	215	182	593	394	704	666	1,210	820	8	1
15	43	71	215	167	560	419	704	629	1,210	781	4	1
16	52	80	232	190	529	445	629	629	1,160	781	4	1
17	54	91	250	215	529	472	742	593	1,260	666	4	1
18	54	102	232	232	500	529	742	629	1,350	629	3	1
19	59	114	215	250	472	529	742	629	1,400	529	3	1
20	61	127	215	......	666	629	560	629	1,450	472	3	1
21	64	120	215	......	560	666	593	593	1,450	419	3	1
22	64	114	215	......	529	781	593	593	1,260	394	2	2
23	64	114	215	......	472	820	593	593	1,070	394	3	1
24	64	120	215	......	472	820	704	666	900	370	3	1
25	64	120	215	......	472	900	742	704	860	347	4	1
26	64	114	215	......	472	820	781	629	941	325	2	1
27	64	114	215	......	445	742	781	629	983	304	5	2
28	64	127	215	......	419	704	820	529	983	265	3	2
29	64	140	215	......	419	781	820	500	1,030	247	3	2
30	64	140	120	......	......	900	860	472	1,030	197	2	1
31	64	......	140	......	......	941	......	472	......	181	2	......

NOTE.—Discharge computed as follows: Oct. 1 to Jan. 19, from a rating curve fairly well defined below 350 second-feet; Feb. 4 to Aug. 6, from a rating curve fairly well defined between 200 and 1,200 second-feet; shift in control assumed to have occurred during ice-affected period Jan. 20 to Feb. 3; Aug. 7-18, discharge by shifting-control method; Aug. 19 to Sept. 30, from a rating curve fairly well defined for extreme low stages. Discharge estimated from observer's notes and weather records, Jan. 20-31, 290 second-feet; Feb. 1-3, 295 second-feet.

Monthly discharge of Walker River at Schurz, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	64	4	37.4	2,300
November	140	64	90.1	5,360
December	250	120	200	12,300
January	....	....	246	15,100
February	704	....	501	28,800
March	941	304	542	33,300
April	983	560	731	43,500
May	983	472	706	43,400
June	1,450	472	943	56,100
July	983	181	649	39,900
August	167	2	30.0	1,840
September	3	1	1.83	109
The year	1,450	1	389	282,000

WEST WALKER RIVER NEAR COLEVILLE, CAL.

LOCATION.—In NE. ¼ NW. ¼ sec. 28, T. 8 N., R. 23 E., at mouth of Ross Canyon, at head of Antelope Valley, 400 feet east of State highway, 1.2 miles above Terry ranch house, 5.5 miles above Coleville, Mono County, and about 40 miles southeast of Gardnerville, Nev.

DRAINAGE AREA.—245 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 1, 1909, to August 31, 1910; June 18, 1915, to September 30, 1916. October 5, 1902, to July 31, 1908, a station was maintained half a mile above present gage.

GAGE.—Water-stage recorder built by S. P. Ferguson, Reno, Nev., installed April 29, 1915, on left bank, 15 feet below large yellow pine tree, to which upper section of outside staff gage is fastened, and about 100 feet above Terry canal heading.

DISCHARGE MEASUREMENTS.—Made from cable 15 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of large boulders. Fairly permanent riffle. Stage-discharge relation affected at times by a temporary jetty built each year at the Terry canal heading. One channel at all stages.

EXTREMES OF DISCHARGE.—1915–16: Maximum stage, from water-stage recorder, 5.4 feet at 2 a. m. June 17, 1916 (discharge, 1,830 second-feet); minimum stage, 2.20 feet at 10 p. m. March 2, 1916 (discharge, 14 second-feet).

ICE.—Stage-discharge relation not seriously affected by ice except for short periods.

DIVERSIONS.—Station is above all diversions in Antelope Valley.

REGULATION.—None.

ACCURACY.—Stage-discharge relation fairly permanent during two conditions of flow—when the jetty at the Terry canal heading is in place and when it has been destroyed by high water. The jetty was washed out April 29–30 and replaced August 9–11. Ice effect January 12 to February 5. Rating curves fairly well defined for ranges in stage for which used. Operation of water-stage recorder unsatisfactory October 1 to February 12; weekly readings on staff gage used for this period; recorder operation satisfactory February 13 to September 30. Daily discharge determined as follows: October 1 to January 9 and February 6, by applying weekly staff-gage readings to rating table; one current-meter measurement used January 12; discharge February 13 to September 30 ascertained by applying to rating table the mean daily gage height determined by inspecting recorder graph, except April 29–30 and August 9–11, when it was interpolated on account of changes in control, and July 24–30 on account of break in gage-height record. Mean monthly flow, October to January, inclusive, estimated from weekly gage readings. Records roughly approximate October 1 to February 12; fair February 13 to September 30.

Discharge measurements of West Walker River near Coleville, Cal., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 16	2.47	45.7	June 8	4.58	1,480
Jan. 12	[a]3.06	84	Aug. 17	3.19	233
Mar. 16	3.17	223			

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of West Walker River near Coleville, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1						80	300	800	734	907	345	190
2	60					19	338	835	766	944	366	176
3						80	300	835	835	871	366	163
4						102	300	982	1,060	907	345	150
5			30			102	300	1,140	1,180	1,020	345	138
6					80	80	319	1,140	1,220	1,020	326	126
7		60				102	338	944	1,300	1,020	307	115
8						102	358	944	1,220	1,020	307	115
9				80		102	420	907	1,380	982	296	115
10	60					114	442	835	1,340	871	286	115
11						140	513	800	1,340	871	276	104
12		36	44	84		168	465	766	1,340	907	266	104
13					90	183	378	734	1,340	944	250	104
14					102	183	399	701	1,300	907	250	94
15					90	198	399	766	1,470	766	250	94
16			44		90	230	420	800	1,560	766	234	94
17	60				90	264	420	800	1,560	701	234	94
18					90	282	399	871	1,470	639	219	84
19					90	319	399	734	1,300	639	204	84
20					90	338	442	734	1,220	639	204	84
21					90	319	513	835	1,100	639	190	84
22		60	51		90	300	563	907	944	610	190	104
23					90	300	642	871	982	639	190	104
24	51				90	247	642	734	1,100		190	104
25					90	230	642	639	1,300		190	94
26					102	230	669	610	1,380		190	84
27					90	264	696	610	1,300		176	84
28		24			90	264	724	701	1,100		190	75
29					102	300	750	907	944		234	66
30						300	775	907	871		234	75
31	60					300		835		345	204	

NOTE.—Mean discharge estimated Feb. 1-5, 80 second-feet, and Feb. 7-12, 85 second-feet. Mean discharge interpolated because of break in gage record July 24-30, 492 second-feet.

Monthly discharge of West Walker River near Coleville, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October			a 58.0	3,570
November			a 48.0	2,860
December			a 45.0	2,770
January			a 80.0	4,920
February	102		88.1	5,070
March	338	19	201	12,400
April	775	300	476	28,300
May	1,140	610	827	50,800
June	1,560	734	1,200	71,400
July	1,020	345	743	45,700
August	366	176	253	15,600
September	190	66	107	6,370
The year	1,560	19	344	250,000

a Estimated on account of fragmentary records.

WEST WALKER RIVER AT HUDSON, NEV.

LOCATION.—About sec. 11, T. 11 N., R. 24 E., at highway bridge at Hudson, Lyon County, 1 mile above canyon, between Smith and Mason valleys.

DRAINAGE AREA.—About 953 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 3, 1914, to September 30, 1916.

GAGE.—Vertical staff fastened to downstream pile in middle bent of highway bridge; read by A. E. Purvine.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of loose sand. Light gravel riffle. One channel at all stages. Gage height of zero flow about 1.5 feet.

Extremes of discharge.—Maximum stage recorded during year, 6.3 feet at 7 a. m. June 18 (discharge, 1,710 second-feet); minimum stage, 2.40 feet October 1 and 2 (discharge, 38 second-feet).

1914–1916: Maximum stage June 18, 1916; minimum stage, 2.30 feet August 25 to September 3, 1915 (discharge, 31 second-feet).

Ice.—Stage-discharge relation not seriously affected by ice.

Diversions.—Below all diversions in Smith Valley and above those in Mason Valley.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent; affected by ice as indicated in note to daily discharge table. Rating curve well defined between 30 and 1,500 second-feet. Gage read to quarter-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table, except as noted in daily discharge table. Records good.

Discharge measurement of West Walker River at Hudson, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 16	3.30	153	June 9	5.85	1,360
Jan. 13	3.30	151	Aug. 19	2.75	79
Mar. 17	3.78	272			

Daily discharge, in second-feet, of West Walker River at Hudson, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	38	96	112	90	......	176	251	657	537	708	176	55
2	38	96	104	137	......	176	223	560	560	708	156	55
3	42	96	112	120	......	176	223	657	608	708	137	55
4	48	96	176	156	......	166	237	708	......	708	120	55
5	55	89	156	137	198	166	237	870	......	708	120	55
6	55	89	146	120	198	156	251	930	......	708	104	55
7	55	89	146	120	223	156	251	990	......	815	104	53
8	67	89	137	156	266	176	251	870	......	930	101	50
9	76	89	137	210	282	176	298	815	......	815	92	50
10	65	96	137	176	514	187	369	708	......	708	92	50
11	70	96	120	137	815	198	492	761	......	761	92	53
12	74	96	120	120	608	198	560	708	......	708	79	60
13	67	104	120	146	408	223	492	708	......	708	74	65
14	70	104	176	146	298	223	470	708	......	657	65	60
15	76	112	176	137	282	251	428	708	1,190	608	65	57
16	92	120	156	137	251	251	449	608	1,330	608	67	55
17	112	120	137	120	223	282	470	608	1,630	470	65	53
18	104	120	146	120	223	315	514	608	1,630	408	67	46
19	104	120	137	120	223	315	492	608	1,330	408	65	42
20	101	120	128	120	223	350	470	608	1,190	388	74	42
21	104	120	120	120	223	350	470	608	815	408	70	42
22	104	112	......	......	237	388	514	708	708	369	65	50
23	96	104	......	......	251	388	584	815	708	388	65	50
24	101	104	......	......	198	350	708	708	708	388	67	53
25	104	104	......	......	187	315	708	608	870	350	63	60
26	112	104	......	......	198	315	708	537	930	315	60	65
27	104	112	120	......	198	315	815	560	1,050	315	57	70
28	112	101	120	......	187	332	761	470	930	251	55	65
29	112	104	112	......	176	350	708	492	930	223	55	65
30	112	120	89	......	......	350	708	537	761	198	55	65
31	104	......	90	......	......	315	......	449	......	176	55	......

Note.—Mean discharge estimated on account of ice: Dec. 22–26, 115 second-feet; Jan. 22–31, 125 second-feet; Feb. 1–4, 150 second-feet. Gage-height record June 4–14 appeared inconsistent; discharge determined from comparison with the record at Coleville, Cal.; June 4–8, 900 second-feet; June 9–14. 1,200 second-feet.

Monthly discharge of West Walker River at Hudson, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	112	38	83.0	5,100
November	120	89	104	6,190
December	176	89	129	7,930
January	210	90	132	8,120
February	815	....	265	15,200
March	388	156	261	16,000
April	815	223	470	28,000
May	990	449	674	41,400
June	1,630	537	1,000	59,500
July	930	176	536	33,000
August	176	55	83.3	5,120
September	70	42	55.0	3,270
The year	1,630	38	316	229,000

HUMBOLDT-CARSON SINK DRAINAGE BASIN.

CARSON RIVER BASIN.

EAST FORK OF CARSON RIVER NEAR MARKLEEVILLE, CAL.

LOCATION.—In NE. ¼ sec. 27, T. 10 N., R. 20 E., at Hangman's bridge, 2 miles east of Markleeville, Alpine County. Indian Creek enters 100 feet above gage and Markleeville Creek 1¼ miles below.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 13, 1910, to September 30, 1916 (fragmentary).

GAGE.—Vertical staff, 75 feet below bridge, bolted to rock ledge on right bank; read by W. J. Clark.

DISCHARGE MEASUREMENTS.—Made from cable installed April 18, 1914, 400 feet below gage, or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; apparently permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.3 feet June 7 and 8 (discharge, 1,480 second-feet); minimum stage recorded, 1.5 feet at 12.36 p. m. September 9 (discharge, 6 second-feet).

1910–1916: Maximum stage recorded, 7.7 feet June 7, 1911 (discharge not determined); minimum stage recorded, 1.45 feet September 20, 1913 (discharge, 6 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—No information.

REGULATION.—Low-water flow is augmented by storage developed on Silver Creek above the station.

ACCURACY.—Stage-discharge relation permanent. No record this year during period of effect of ice. Rating curve fairly well defined above 40 second-feet. Gage read to half-tenths occasionally.. Discharge ascertained by applying gage height to rating table. Records good for periods covered by gage-height record. On account of fragmentary gage-height record, monthly discharge has not been determined.

COOPERATION.—Gage-height record furnished by United States Forest Service.

No discharge measurements were made at this station during the year ending September 30, 1916.

Daily discharge, in second-feet, of East Fork of Carson River near Markleeville, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1								
2		54			794			
3							184	99
4	60							
5					1,130			
6	60				1,230		165	92
7				1,200	1,480	722		
8					1,480			7
9			745				156	6
10			794			675		
11						652		
12								
13	54							
14		54			1,400		24	
15					1,440			
16		60	698					78
17								92
18		49		928				99
19					956			106
20				755				98
21	54							106
22	54	60				370		106
23	54			900				106
24					1,040	340		
25							99	
26		66			985			106
27				608				
28				652	928		122	114
29								
30			900	928			204	114
31								

CARSON RIVER NEAR EMPIRE, NEV.

LOCATION.—In sec. 12, T. 15 N., R. 20 E., just below tailrace of Brunswick mill, one-quarter mile below highway bridge and 2 miles below Empire, Ormsby County.

DRAINAGE AREA.—988 square miles (measured on topographic map).

RECORDS AVAILABLE.—June 25 to December 31, 1895; October 21, 1900, to September 30, 1916.

GAGE.—Inclined staff on left bank used since February 24, 1911; vertical staff on left abutment of highway bridge, June 7, 1907, to February 23, 1911; prior to June 7, 1907, several gages at different points.

DISCHARGE MEASUREMENTS.—Made from cable one-quarter mile above gage or by wading just above bridge. When made from cable the power canal is measured and the result added.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.8 feet February 11 (discharge, 3,100 second-feet); minimum stage, 2.8 feet August 28 (discharge, 16 second-feet).

1895, 1900–1916: Maximum stage recorded, 8.0 feet January 23, 1914 (discharge 5,160 second-feet); minimum stage, 0.7 foot August 31 and September 4, 5, and 14, 1905 (discharge, zero).

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—A large amount of water is diverted above the station for irrigation in Carson Valley. The water diverted by the Brunswick mill power canal is returned to river above gage.

COOPERATION.—Records furnished by the United States Reclamation Service.

Discharge measurements of Carson River near Empire, Nev., during the year ending Sept. 30, 1916.

[Made by R. E. Hartley.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 1	5.70	1,536.4
July 25	3.80	199.3

Daily discharge, in second-feet, of Carson River near Empire, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	27	69	155	640	860	512	860	1,800	1,270	940	69	36
2	27	69	155	391	940	450	780	1,800	1,270	860	69	27
3	36	69	155	285	710	450	780	1,800	1,270	940	50	27
4	36	93	194	450	512	450	780	1,910	1,270	860	27	36
5	36	93	335	450	512	450	780	2,390	1,270	780	27	36
6	36	93	285	450	575	450	860	2,520	1,470	780	27	50
7	36	93	285	391	1,020	450	940	2,950	1,800	780	27	50
8	36	93	236	335	1,470	450	940	2,800	2,150	780	27	36
9	36	93	236	236	1,270	391	1,100	2,270	2,150	780	27	36
10	50	93	236	122	1,690	512	1,270	2,150	2,390	780	27	27
11	50	122	194	450	3,100	640	1,370	1,910	2,270	780	27	27
12	50	122	194	575	2,150	780	1,690	1,800	2,030	640	36	27
13	50	93	236	710	1,020	860	1,370	1,800	2,030	640	36	27
14	50	93	236	640	780	1,020	1,020	1,470	2,030	640	36	27
15	50	122	391	575	640	860	1,180	1,370	2,030	640	36	27
16	50	122	335	575	575	860	1,180	1,370	2,030	512	36	27
17	50	155	236	450	512	940	1,180	1,370	2,150	512	50	27
18	50	155	236	236	512	1,020	1,270	1,470	2,150	450	50	27
19	50	155	236	335	575	1,100	1,180	1,580	2,030	391	36	27
20	50	155	194	575	512	1,270	1,180	1,470	1,800	335	36	27
21	50	155	194	940	512	1,580	1,100	1,470	1,580	285	36	27
22	69	155	194	1,100	640	1,180	1,180	1,580	1,470	285	36	36
23	69	155	236	860	575	1,020	1,270	1,580	1,470	236	36	27
24	69	122	236	710	512	940	1,470	1,690	1,370	236	36	36
25	69	122	236	1,020	512	780	1,690	1,470	1,180	236	27	36
26	69	122	236	1,100	450	780	1,690	1,370	1,180	236	27	26
27	69	122	236	1,100	512	780	1,910	1,020	1,180	194	27	50
28	69	122	236	575	512	780	2,030	940	1,100	122	16	50
29	69	122	194	391	512	780	1,910	1,020	1,100	122	21	50
30	69	155	194	512	......	860	1,690	1,180	940	122	27	36
31	69	......	391	575	......	860	......	1,270	......	93	36	......

Monthly discharge of Carson River near Empire, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	69	27	51.5	3,170
November	155	69	117	6,960
December	391	155	237	14,600
January	1,100	122	573	35,200
February	3,100	450	851	49,000
March	1,580	391	782	48,100
April	2,030	780	1,260	75,000
May	2,950	940	1,700	105,000
June	2,390	940	1,650	98,200
July	940	93	516	31,700
August	69	16	34.9	2,150
September	50	27	33.8	2,010
The year	3,100	16	647	471,000

NOTE.—Monthly discharge computed by U. S. Geological Survey.

CARSON RIVER NEAR FORT CHURCHILL, NEV.

LOCATION.—In sec. 5, T. 16 N., R. 23 E., 1 mile west of Clifton station, on Mound House - Churchill branch of Southern Pacific Railroad, 9 miles west of Fort Churchill, Lyon County, and 10 miles below Dayton.

DRAINAGE AREA.—1,200 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 13, 1911, to September 30, 1916.

GAGE.—Inclined staff on right bank, with vertical extension for high water.

DISCHARGE MEASUREMENTS.—Made from suspension bridge 500 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge during the year ending September 30, 1915, 2,220 second-feet June 2 and 3; minimum mean daily discharge, 8 second-feet September 14 and 15.

Maximum mean daily discharge during the year ending September 30, 1916, 3,950 second-feet February 11; minimum mean daily discharge, 12 second-feet October 1–13.

1911–1916: Maximum mean daily discharge, 6,150 second-feet January 26, 1914; minimum mean daily discharge, 8 second-feet September 14–15, 1915.

ICE.—No information.

DIVERSIONS.—Carson and Dayton valleys are irrigated above the station.

REGULATION.—Flow affected by diversions.

COOPERATION.—Records furnished by United States Reclamation Service.

Discharge measurements of Carson River near Fort Churchill, Nev., during the year ending Sept. 30, 1915.

[Made by R. E. Hartley.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Apr. 18	5.10	719
May 31	7.30	2,340
July 18	4.20	282

Daily discharge, in second-feet, of Carson River near Fort Churchill, Nev., for the years ending Sept. 30, 1915 and 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	58	146	171	146	433	369	433	730	1,820	730	83	23
2	63	146	171	146	369	337	433	730	2,220	730	66	23
3	74	141	171	171	369	337	465	690	2,220	770	66	23
4	69	153	171	171	369	337	465	690	2,140	770	66	23
5	66	151	171	196	337	337	465	770	2,060	770	36	23
6	69	151	146	196	337	337	465	770	2,060	770	28	23
7	74	151	146	196	337	307	500	810	1,980	730	23	17
8	80	146	146	196	369	307	500	850	1,900	690	23	17
9	83	146	146	196	401	307	500	900	1,900	610	28	12
10	87	141	146	222	433	307	535	950	1,750	570	36	12
11	97	151	146	222	433	307	535	950	1,680	570	36	12
12	103	151	146	222	570	307	570	1,000	1,540	535	36	10
13	103	141	146	250	500	307	570	1,050	1,400	535	36	10
14	123	146	146	250	433	337	610	1,000	1,340	535	36	8
15	117	146	123	222	307	337	650	1,050	1,280	500	36	8
16	109	151	123	222	307	337	650	1,100	1,220	465	36	10
17	103	151	123	222	307	337	650	1,220	1,100	433	36	12
18	103	153	123	222	500	337	650	1,340	1,050	369	36	12
19	103	151	171	250	780	369	650	1,400	1,000	337	36	12
20	107	146	222	250	570	401	610	1,280	950	337	30	12
21	113	146	250	278	433	401	610	1,220	950	307	23	12
22	119	153	307	337	433	433	650	1,050	950	337	23	12
23	119	151	369	278	433	433	650	1,050	900	196	23	12
24	123	162	433	196	433	433	610	1,000	850	123	23	12
25	128	171	433	196	369	433	650	950	850	103	23	12
26	130	166	369	278	369	433	690	950	810	103	23	12
27	128	171	307	278	369	433	730	1,000	770	83	23	12
28	123	176	278	337	369	433	770	1,100	730	103	23	12
29	118	176	222	433	......	433	730	1,220	730	103	23	12
30	128	176	171	500	......	433	730	1,340	730	103	23	12
31	139	......	146	433	......	433	......	1,540	......	83	23	......

Daily discharge, in second-feet, of Carson River near Fort Churchill, Nev., for the years ending Sept. 30, 1915 and 1916—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1915–16.												
1	12	103	222	250	1,220	690	1,280	1,680	1,540	1,050	123	23
2	12	103	222	250	1,160	610	1,280	1,980	1,400	1,020	103	23
3	12	123	278	250	1,050	610	1,400	2,140	1,280	1,000	83	23
4	12	123	278	250	1,050	610	1,220	2,220	1,400	950	83	23
5	12	146	278	250	1,050	690	1,100	2,400	1,540	950	50	23
6	12	146	278	250	1,050	690	1,050	3,050	1,680	900	36	23
7	12	146	307	250	1,050	650	1,050	2,850	1,750	900	36	23
8	12	146	337	275	1,540	610	1,160	2,490	1,750	900	23	23
9	12	171	337	300	1,340	850	1,280	2,400	1,900	834	36	23
10	12	171	337	337	2,060	1,160	1,400	2,140	2,220	850	36	36
11	12	171	337	370	3,950	1,050	1,680	1,980	2,140	850	23	36
12	12	196	337	420	3,650	1,050	1,980	1,820	2,060	810	23	36
13	12	196	337	500	3,050	1,050	2,140	1,750	1,980	810	23	36
14	36	196	337	600	1,820	1,160	1,820	1,540	1,900	730	23	36
15	36	196	337	700	810	1,280	1,610	1,470	1,750	690	23	36
16	50	196	337	730	810	1,400	1,540	1,340	1,900	650	23	36
17	83	222	337	800	770	1,280	1,400	1,340	1,900	610	23	36
18	83	222	337	900	810	1,280	1,340	1,470	1,980	560	23	36
19	83	222	337	1,000	770	1,400	1,280	1,540	1,980	500	23	36
20	83	222	337	1,050	770	1,280	1,160	1,400	1,820	465	23	36
21	83	222	337	1,100	850	1,540	1,220	1,280	1,750	401	23	36
22	83	222	337	1,200	1,160	1,400	1,280	1,400	1,610	369	23	50
23	83	222	337	1,280	950	1,280	1,280	1,470	1,540	278	23	36
24	83	222	337	1,050	850	1,050	1,400	1,540	1,540	278	23	36
25	83	222	337	1,050	770	950	1,540	1,400	1,400	250	23	36
26	83	222	369	1,220	770	950	1,680	1,280	1,340	250	23	23
27	83	222	369	1,160	690	850	1,900	1,160	1,280	222	23	83
28	83	222	337	1,050	690	850	1,980	1,100	1,220	222	23	83
29	83	222	307	1,050	770	1,160	1,980	1,050	1,160	169	23	123
30	103	222	278	1,050	......	1,280	1,820	1,280	1,100	146	23	123
31	103	......	278	1,050	......	1,280	......	1,400	......	146	23	......

Monthly discharge of Carson River near Fort Churchill, Nev., for the years ending Sept. 30, 1915 and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914–15.				
October	139	58	102	6,270
November	176	141	154	9,160
December	433	123	204	12,500
January	500	146	249	15,300
February	780	307	417	23,200
March	433	307	367	22,600
April	770	433	591	35,200
May	1,540	690	1,020	62,700
June	2,220	730	1,360	80,900
July	770	83	432	26,600
August	83	23	34.3	2,110
September	23	8	14.1	839
The year	2,220	8	411	297,000
1915–16.				
October	103	12	50.4	3,100
November	222	103	188	11,200
December	369	222	318	19,600
January	1,280	250	709	43,600
February	3,950	690	1,290	74,200
March	1,540	610	1,030	63,300
April	2,140	1,050	1,480	88,100
May	3,050	1,050	1,720	106,000
June	2,220	1,100	1,660	98,800
July	1,050	146	605	37,200
August	123	23	35.2	2,160
September	123	23	41.1	2,450
The year	3,950	12	756	550,000

NOTE.—Monthly discharge computed by United States Geological Survey.

MARKLEEVILLE CREEK[1] ABOVE MARKLEEVILLE, CAL.

LOCATION.—At highway bridge above mouth of Pleasant Valley Creek, three-quarters of a mile above Markleeville, Alpine County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 7, 1911, to September 30, 1916 (fragmentary).

GAGE.—Vertical staff in two sections on left abutment of bridge; read by Forest Service rangers. Datum of gage was raised 5.71 feet, August 18, 1914.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Gravel and small boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.5 feet at 5.50 p. m. April 20 (discharge, 540 second-feet); minimum stage recorded, 0.7 foot at 4.30 p. m. September 19 (discharge, 0.1 second-foot).

1911–1916: Maximum stage recorded, 3.5 feet at 7 p. m. May 28, 1915, and at 5.50 p. m. April 20, 1916 (discharge, 540 second feet); minimum stage recorded, 0.7 foot September 19, 1916 (discharge, 0.1 second-foot).

ICE.—Stage-discharge relation occasionally affected by ice.

DIVERSIONS.—Town ditch, which heads above the gage, furnishes water for irrigation and domestic supply at Markleeville. Also, a small ditch diverts water for irrigation on Hot Springs ranch.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation probably permanent; possibly affected by ice November 10, 13, and 15 as observer reported, "Creek full of ice." Rating curve well defined except for extreme low stages and high stages for which it has been extended. Gage read to half-tenths occasionally. Discharge ascertained by applying gage height to rating table. Records fair.

COOPERATION.—Gage-height record furnished by United States Forest Service.

No discharge measurements were made at this station during the year ending September 30, 1916.

Daily discharge, in second-feet, of Markleeville Creek above Markleeville, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1								1.5
2		1.4		230	172			
3				328				1.0
4	0.8			345				
5	1.0							
6	1.1							
7				245		76	5.5	
8	1.0							
9	1.0		125	230			5.5	1.5
10		5.5	135	200			3.5	
11			160			68		1.0
12			115	185	230			
13	1.2	7.2	115					1.5
14	1.2		125		260		3.5	1.0
15		5.5	131	200	292			
16				185	260			1.0
17		5.5	135					
18			135	200				.5
19	1.1		135			42		.1
20			540					.5
21						36		
22	1.0		172			42		
23	1.2							
24		3.1	215					
25			230					1.0
26		3.1	245					1.0
27			245					
28			230		160			1.0
29			185				4.5	
30					115			1.5
31								

NOTE.—Gage read twice daily Apr. 11, 13–15, 22, 26–28, and May 16.

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[1] Locally known as Hot Springs Creek.

MARKLEEVILLE CREEK AT MARKLEEVILLE, CAL.

LOCATION.—In SE. ¼ sec. 21, T. 10 N., R. 20 E., at highway bridge at Markleeville, Alpine County, three-quarters of a mile below junction with Pleasant Valley Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 11, 1910, to September 30, 1916 (fragmentary).

GAGE.—Vertical staff on left abutment of highway bridge near downstream end; read by Forest Service rangers.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; somewhat shifting during high water. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.2 feet at 5.52 p. m. May 4, 6.10 p. m. June 8, and 6.20 p. m. June 16 (discharge, 700 second-feet); minimum stage recorded, 0.80 foot at 8.20 a. m. October 2 (discharge, 4 second-feet) may have been lower September 16.

1910–1916: Maximum stage recorded, 5.3 feet June 15, 1912 (discharge, 915 second-feet); minimum stage recorded, 0.70 foot September 20, 1913 (discharge, 3 second-feet); may have been lower September 16, 1916. Flood of March, 1907, reached stage about 9 feet.

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—See Markleeville Creek above Markleeville. Water is also diverted from Pleasant Valley Creek for irrigation purposes.

REGULATION.—The diversions partly regulate the flow. Some storage has been developed on Pleasant Valley Creek.

ACCURACY.—Stage-discharge relation considered permanent although no discharge measurements were made at this station during the year ending September 30, 1916. It may have been affected by ice November 13 to 15, as observer reported, "Creek full of ice." Rating curve fairly well defined below 500 second-feet and extended above. Gage read to half-tenths occasionally. Daily discharge ascertained by applying daily gage height to rating table.

COOPERATION.—Gage-height record furnished by United States Forest Service.

Daily discharge, in second-feet, of Markleeville Creek at Markleeville, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1								
2	4.0	8.0		424				
3		8.0		600				46
4				700				
5								
6	5.0				507			
7				507	507	150		
8	5.0				625			
9	5.0		263	444			18	9.0
10			290	406		130		
11			320			125		
12			237	387	464			
13	8.0	21	212					9.0
14	7.4	24	237		530		16	
15		9.0	263	352	562			
16		9.0	263		610			
17		9.0	263					
18		9.0	237	406				
19			237			77		9.0
20				314				8.0
21	8.0			464				9.0
22	8.0	8.0	320			71		
23	7.0							10
24		9.0	387			65		
25			424					
26		9.0	464					9.0
27			507	290				
28			464	290	263		11	9.0
29					224		27	
30			320	305	201		10	11
31								

NOTE.—Gage read twice daily Apr. 15, May 20, June 8, 15, 16, July 7, and Sept. 19.

WEST FORK OF CARSON RIVER AT WOODFORDS, CAL.

LOCATION.—In SE. ¼ sec. 34, T. 11 N., R. 19 E., at highway bridge at Woodfords, Alpine County.

DRAINAGE AREA.—70 square miles.

RECORDS AVAILABLE.—April, 1890, to March, 1892; October 18, 1900, to September 30, 1915; April 12 to September 30, 1916.

GAGE.—Vertical staff on right bank just above highway bridge, installed at independent datum August 21, 1914; read by Mrs. M. Merrill. Original gage, near present site, used April, 1890, to March, 1892. Vertical staff on left bank at cable half a mile above bridge read October 18, 1900, to May 18, 1907. Vertical staff on left bank just above highway bridge June 8, 1907, to November 10, 1913, except for certain periods in 1910 and 1911 when gage at cable was used. Vertical staff on right bank 20 feet above site of previous gage November 11, 1913, to August 20, 1914.

DISCHARGE MEASUREMENTS.—Made from cable half a mile above gage or by wading.

CHANNEL AND CONTROL.—Fine gravel and boulders; section rough but fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 5.4 feet at 5 p. m. May 7 (discharge, 1,180 second-feet); minimum stage recorded, 0.9 foot September 3 (discharge, 11 second-feet).

1900–1916: Maximum stage recorded, 6.8 feet May 9 and 10, 1906 (discharge, 1,570 second-feet); minimum stage recorded 0.8 foot on several days in August and September, 1915 (discharge, 8 second-feet).

ICE.—Stage-discharge relation somewhat affected by ice. No record during winter of this year.

DIVERSIONS.—Three irrigation canals divert on right bank between cable and gage. The water is used mainly for irrigation in California. Their flow is not included in record.

REGULATION.—Flow partially regulated by diversions.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 20 and 100 second-feet; fairly well defined above 100 second-feet. Gage read to half tenths twice daily from April 12 to June 30 and once daily July 1 to September 30. Daily discharge determined by applying mean daily gage heights to rating table except for days when gage was not read, for which it was interpolated. Records good.

Discharge measurements of West Fork of Carson River at Woodfords, Cal., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Mar. 13[a]	L. W. Jordan	1.70	64
June 7[b]	Jacob and Jordan	3.28	469
Aug. 16[c]	L. W. Jordan	1.60	54

[a] Cable gage read 1.35 feet. No water in canals.
[b] Cable gage read 3.50 feet.
[c] Cable gage read 1.20 feet. No water in canals.

Daily discharge, in second-feet, of West Fork of Carson River at Woodfords, Cal., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	637	386	186	77	14	16	418	484	326	186	53	14
2	......	742	434	186	77	12	17	402	371	271	144	53	23
3	......	742	534	125	77	11	18	326	386	233	144	44	29
4	......	814	500	125	77	18	19	371	356	164	164	44	29
5	......	1,030	500	125	70	18	20	418	356	144	164	36	29
6	......	958	500	125	64	18	21	450	356	144	164	29	29
7	......	1,070	450	125	53	23	22	500	356	154	164	29	36
8	......	1,030	434	125	64	26	23	568	341	164	144	29	36
9	......	958	386	125	64	29	24	637	312	154	144	29	36
10	......	922	356	186	64	29	25	742	284	154	125	29	36
11	......	707	341	186	64	23	26	850	233	175	125	29	36
12	434	672	402	186	64	18	27	850	233	175	108	36	36
13	467	637	418	186	64	18	28	850	271	175	108	36	36
14	418	568	402	186	36	16	29	814	284	175	92	18	36
15	402	500	371	186	29	14	30	602	298	164	92	16	30
							31	......	312	......	77	14	......

NOTE.—Observer's report on operation of canals diverting above gage. Canals dry until June 7, 1916.

June 7, 2 canals carrying water.
June 8, 3 canals carrying water.
12, canals dry.
19, 3 canals carrying water.
22, 2 canals carrying water.
26, canals dry.
July 3, 3 canals carrying water.
10, canals dry.
17, 2 canals carrying water.
July 24, canals dry.
31, 2 canals carrying water.
Aug. 7, canals dry.
14, 3 canals carrying water.
16, canals dry.
28, 3 canals carrying water.
Sept. 3, canals dry.
11, 3 canals carrying water.
18, canals dry.

Monthly discharge of West Fork of Carson River at Woodfords, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 12-30	850	326	554	20,900
May	1,069	233	555	34,100
June	534	144	306	18,200
July	186	77	145	8,920
August	77	14	47.4	2,910
September	36	11	25.3	1,510
The period	1,069	11	254	86,500

HUMBOLDT RIVER BASIN.

HUMBOLDT RIVER AT PALISADE, NEV.

LOCATION.—In sec. 36, T. 32 N., R. 51 E., at highway bridge at Palisade, Eureka County, 100 feet below Southern Pacific Railroad bridge and about a mile above mouth of Pine Creek.

DRAINAGE AREA.—5,010 square miles.

RECORDS AVAILABLE.—November 27, 1902, to October 19, 1906; July 26, 1911, to September 30, 1916.

GAGE.—Chain gage at highway bridge December 1, 1911, to September 30, 1916; read by Albina Siri; datum same as that of inclined staff on left bank near Southern Pacific Railroad bridge, read from July 26 to November 30, 1911. Original gage was a vertical staff on right abutment of the highway bridge which was destroyed by high water in 1910. No determined relation between the original and present datum.

DISCHARGE MEASUREMENTS.—Made from cable about an eighth of a mile above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel. Control at low stages is a gravel bar 50 to 75 feet below gage; at high stages a pile bent railroad bridge about 300 feet below gage and a rock riffle a few hundred feet farther downstream become effective; both fairly permanent. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.54 feet at 2 p. m. March 21 (discharge, 1,810 second-feet); minimum stage, 1.01 feet at 2.10 p. m. October 9 (discharge, 17 second-feet).

1903–1906, 1911–1916: Maximum stage recorded, 7.5 feet January 25, 1914 (discharge, 2,780 second-feet); minimum stage, 0.96 foot, August 28 to September 1, 1915 (discharge, 12 second-feet).

ICE.—Stage-discharge relation slightly affected by ice.

DIVERSIONS.—Some water diverted for irrigation in valley above canyon.

REGULATION.—Flow affected by irrigation diversions above.

ACCURACY.—Stage-discharge relation fairly permanent; affected by ice December 29 to January 5, January 18–24, January 30 to February 2. Rating curve well defined between 0 and 2,000 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Humboldt River at Palisade, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 15[a]	A. B. Purton	1.33	37.3	Mar. 22	L. W. Jordan	5.21	1,580
Jan. 8	L. W. Jordan	[b] 1.71	80	May 13	....do	3.74	713
Mar. 9	....do	2.62	292	June 5	....do	3.02	413
10	....do	2.72	316	Aug. 14	....do	1.22	32.2

[a] Point of zero flow determined at gage height 0.4±.2.

[b] Slight effect from ice.

Daily discharge, in second-feet, of Humboldt River at Palisade, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	19	36	81	......	......	275	1,300	889	553	407	66	23
2	21	36	84	......	......	258	1,430	889	513	407	60	23
3	21	36	86	......	84	242	1,360	889	475	390	53	33
4	21	38	89	......	86	227	1,360	835	440	374	48	23
5	17	38	89	......	92	242	1,300	889	407	374	44	22
6	20	38	89	84	95	275	1,360	889	407	341	42	22
7	20	38	86	64	98	275	1,360	889	374	324	41	22
8	17	39	86	77	98	275	1,360	835	374	308	39	21
9	17	39	86	81	101	275	1,360	783	390	308	38	21
10	18	41	86	81	118	341	1,360	733	475	292	36	21
11	18	41	86	74	107	390	1,360	733	513	275	35	21
12	18	42	86	79	98	440	1,430	733	553	258	33	25
13	18	42	86	89	92	475	1,360	685	553	242	32	28
14	18	41	104	84	98	553	1,360	685	553	212	30	28
15	21	39	96	76	107	595	1,360	685	595	212	29	28
16	21	39	84	69	121	639	1,360	685	639	185	28	26
17	28	39	70	55	140	639	1,360	639	639	173	26	26
18	29	41	62	......	140	835	1,360	639	685	161	26	25
19	29	41	62	......	150	1,150	1,360	595	685	150	25	25
20	30	41	62	......	161	1,460	1,300	595	685	140	25	25
21	30	42	64	......	161	1,780	1,240	595	685	140	25	26
22	30	44	69	......	173	1,780	1,240	513	685	130	23	26
23	32	49	74	......	185	1,640	1,180	475	639	121	23	29
24	32	53	79	......	198	1,640	1,120	475	639	118	23	29
25	33	57	98	81	212	1,640	1,060	513	595	111	22	28
26	33	62	95	81	227	1,640	1,000	513	553	101	22	26
27	33	66	92	81	227	1,640	1,000	475	513	95	22	26
28	35	66	86	74	242	1,570	1,000	513	513	86	21	26
29	35	71	......	71	275	1,570	945	513	475	81	25	25
30	35	76	......	......	......	1,360	945	553	440	76	25	25
31	35	......	......	......	......	1,360	......	595	......	71	25	......

NOTE.—Discharge estimated, on account of ice, Dec. 29 to Jan. 5, 80 second-feet; Jan. 18-23, 50 second-feet; Jan. 24, 70 second-feet; Jan. 30 to Feb. 2, 75 second-feet. Discharge interpolated Mar. 19 and 20.

Monthly discharge of Humboldt River at Palisade, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	35	17	25.3	1,560
November	76	36	45.7	2,720
December	104	62	82.5	5,070
January	89		71.3	4,380
February	275		139	8,000
March	1,780	227	886	54,500
April	1,430	945	1,260	75,000
May	889	475	675	41,500
June	635	374	542	32,300
July	407	71	215	13,200
August	66	21	32.6	2,000
September	29	21	24.8	1,480
The year	1,780	17	333	242,000

HUMBOLDT RIVER NEAR GOLCONDA, NEV.

Location.—In sec. 21, T. 36 N., R. 40 E., at highway bridge about 1¼ miles northwest of Golconda, Humboldt County, and about 12 miles above mouth of Little Humboldt River.

Drainage area.—10,800 square miles.

Records available.—October 24, 1894, to December 31, 1909; September 8, 1910, to September 30, 1916.

Gage.—Chain gage on downstream side of bridge near right bank, installed November 5, 1910; read by Florence Bernard. Several gages at various datums and at various sites used prior to this date.

Discharge measurements.—Made from highway bridge at gage or by wading.

Channel and control.—Bed composed of loose sand; shifts occasionally. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 8.7 feet at 2.40 p. m. April 23 and 10 a. m. April 24 (discharge, 1,320 second-feet); minimum stage, 1.8 feet Octber 1–23 (discharge, 0.4 second-foot).

1900–1916: Maximum stage recorded, 16.6 feet April 3, 5, 6, 8, 10, 13, 15, 17, 20, 22, 24, 27, 29, and May 1, 1907 (discharge, 3,160 second-feet); minimum stage, 2.7 feet January 2, 4, 6, 9, 10, 11, and 17, 1906 (discharge, zero).

Ice.—Stage-discharge relation not seriously affected by ice.

Diversions.—Considerable water is diverted above the station.

Regulation.—Low water flow regulated by following diversion dams, which provide practically no storage: Bernard's dam, rock and brush, half a mile above gage; Anderson's dam, rock and brush, 1½ miles above; Taylor and Sheehan dam, concrete spillway with flashboards, small power plant which develops power for pumping into high-line canal; Pinson's dam, rock and brush, about 5 miles above gage.

Accuracy.—Stage-discharge relation not permanent; affected by ice. Rating curves fairly well defined for ranges of stage used. Chain gage read once each day to hundredths. Daily discharge ascertained by applying daily gage height to rating tables, except November 17–30 and May 24 to June 8, when shifting-control method was used, and for periods when stage-discharge relation was affected by ice, as given in footnote to daily discharge table.

Discharge measurements of Humboldt River near Golconda, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 16[a]	A. B. Purton	1.90	1.2	May 11	L. W. Jordan	6.56	649
Jan. 9	L. W. Jordan	[b] 2.70	33.2	June 13	.....do	3.20	66
Mar. 10	.....do	4.80	298	Aug. 21	.....do	2.40	20.8
20	.....do	6.61	667				

[a] Point of zero flow determined at gage height 1.6±0.1.
[b] Shore ice at gage; control partly open.

Daily discharge, in second-feet, of Humboldt River near Golconda, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.4	0.7	32	24		231	935	1,220	227	9	53	25
2	.4	.7	32	25		238	995	1,150	211	9	53	25
3	.4	.7	32	26		252	1,030	1,120	208	9	53	25
4	.4	.7	32	29		252	1,090	1,060	168	9	53	25
5	.4	.7	32	32		252	1,120	1,030	134	13	53	25
6	.4	.7	32	36		252	1,150	1,030	115	13	74	25
7	.4	.7	32	45		267	1,220	995	95	13	74	25
8	.4	.7	29	40		283	1,250	965	84	13	74	25
9	.4	.7	29	33		283	1,250	935	74	9	74	25
10	.4	.7	29		137	283	1,250	905	74	13	74	21
11	.4	.7	29		130	283	1,280	624	74	17	74	21
12	.4	.7	29		122	283	1,280	624	74	53	74	17
13	.4	.7	29		142	283	1,280	624	70	53	41	17
14	.4	.7	29		152	275	1,280	547	70	60	35	17
15	.4	.7	29		163	267	1,280	476	67	60	25	17
16	.4	.7	29		174	252	1,280	391	67	60	25	17
17	.4	1.5	28		198	252	1,280	391	47	60	21	13
18	.4	2	27		198	252	1,280	432	47	60	21	13
19	.4	3	26		198	391	1,280	476	35	74	17	13
20	.4	4	26		224	678	1,280	476	25	74	21	13
21	.4	5	26		283	678	1,280	476	25	74	21	13
22	.4	6	26		238	678	1,280	476	21	74	21	13
23	.4	8	26		211	678	1,320	523	21	74	25	13
24	.7	9	26		211	678	1,320	450	21	67	25	6
25	.7	10	26		211	733	1,280	383	17	67	25	6
26	.7	12			211	789	1,280	341	17	67	25	6
27	.7	14			218	789	1,280	320	13	74	25	6
28	.7	21			224	847	1,250	316	13	74	25	6
29	.7	23			224	876	1,250	313	9	74	25	6
30	.7	29				876	1,220	277	9	53	25	6
31	.7					905		258		53	25	

NOTE.—Mean discharge estimated on account of ice as follows: Dec. 26–31 and Jan. 10–22, 25 second-feet; an. 23–31, 35 second-feet; Feb. 1–9, 100 second-feet.

Monthly discharge of Humboldt River near Golconda, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0.7	0.4	0.477	29.3
November	29	.7	5.29	315
December	32		28.1	1,730
January			30.0	1,840
February	283		164	9,430
March	905	231	462	28,400
April	1,320	935	1,230	73,200
May	1,220	258	632	38,900
June	227	9	71.1	4,230
July	74	9	46.2	2,840
August	74	17	40.5	2,490
September	25	6	16.2	964
The year	1,320	.4	226	164,000

HUMBOLDT RIVER NEAR OREANA, NEV.

LOCATION.—In sec. 35, T. 29 N., R. 32 E., 2 miles above highway bridge near J. J. McCarthy's ranch and 2 miles southwest of Oreana, Humboldt County (railroad station called Nenzel).

DRAINAGE AREA.—About 13,800 square miles (measured on map issued by General Land Office).

RECORDS AVAILABLE.—January 27, 1896, to December 31, 1909; September 7, 1910, to September 30, 1916.

GAGE.—Friez water-stage recorder on right bank February 24 to August 22, 1914, and October 4, 1914, to September 30, 1916; inspected by Nora McCarthy. Original gage, vertical staff nailed to the right abutment of the old highway bridge, was installed January 27, 1896, and was washed out May 26, 1897. A temporary gage was used until September 7, 1897; September 8 a new inclined staff gage was installed on the left bank about 1½ miles above the old bridge and opposite the railroad section house. This gage was washed out in 1902. A vertical staff gage fastened to piling of old Lovelocks Valley dam, at the same datum and presumably at the same site as the inclined gage, was read from November 29, 1902, until December 31, 1909, when station was discontinued. The datum was lowered 2.0 feet October 1, 1904. Station was reestablished September 7, 1910, a temporary gage, at a new datum, 150 feet above the bridge, being used until November 9, 1910; then a permanent vertical staff gage was installed at the highway bridge, which was read November 9, 1910, to February 23, 1914, and August 23 to October 3, 1914.

DISCHARGE MEASUREMENTS.—Made from cable 20 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand; principal control not well defined, but is probably about half a mile below gage, where bed is composed of firm clay; fairly permanent; low-water control is about 50 feet below gage. Right bank high and comparatively clean; left bank not likely to overflow, but subject to caving. Point of zero flow about at gage height 0.3 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.44 feet at 2 p. m May 2 (discharge, 793 second-feet; minimum stage from water-stage recorder, 0.50 foot on October 2 (discharge, 2.6 second-feet).

1896–1916: Maximum stage recorded, 12.0 feet May 12, 1897 (discharge, 3,050 second-feet); minimum stage, river dry in June and July, 1905, and in August and September, 1915.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Station is above all diversions for the Lovelocks district, but considerable water is diverted above the station for direct irrigation and storage.

REGULATION.—Flow is affected by water stored and released by the Humboldt-Lovelocks Irrigation, Light & Power Co., at its reservoirs a few miles up the river, near Humboldt.

ACCURACY.—Stage-discharge relation fairly permanent at higher stages, but not at extremely low stages, when stream flows through winding channel in shifting sand bed of river; affected by ice December 16 to February 20. Rating curve used October 29 to August 16 well defined between 10 and 800 second-feet; curves used October 1–19 and August 20 to September 30, not well defined. Operation of water-stage recorder satisfactory. Daily discharge ascertained by applying to rating table mean daily gage height determined by inspecting recorder graph, except for periods during which stage-discharge relation was affected by ice or by shifting control; ascertained by shifting-control method October 20–28, and August 17–19; interpolated on days for which gage record is missing. Records obtained by use of rating tables good; others fair.

Discharge measurements of Humboldt River near Oreana, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 16	A. B. Purton..........	0.93	24.2	May 10	L. W. Jordan..........	3.74	602
Dec. 19[a]	L. W. Jordan..........	1.18	13.8	June 12	.....do.................	1.71	132
Jan. 15[b]	......do...............	1.46	24.7	Aug. 21	.....do.................	0.98	20.3
Mar. 20	......do...............	1.45	82				

[a] Complete ice cover, 0.10 foot thick; mush ice underneath.
[b] Complete ice cover 0.80 foot thick; mush ice underneath.

Daily discharge, in second-feet, of Humboldt River near Oreana, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.0	11	23	......	119	277	760	335	62	196	20
2	2.6	12	26	......	123	284	788	293	59	194	23
3	3.6	12	24	......	115	323	776	268	57	154	22
4	4.0	12	25	......	102	398	740	230	54	100	20
5	4.3	12	26	......	85	396	691	204	52	82	19
6	4.0	12	26	......	71	400	672	180	70	74	19
7	4.3	12	26	......	62	459	650	182	115	71	20
8	4.6	12	28	......	57	550	626	202	121	68	20
9	5.8	12	27	......	52	583	615	186	123	65	20
10	7.4	14	28	......	47	607	599	159	128	87	18
11	7.8	14	27	......	44	645	556	144	146	87	17
12	7.8	16	26	......	41	661	456	130	156	83	16
13	8.6	17	26	......	79	677	459	121	169	80	14
14	9.4	19	30	......	171	691	464	148	176	78	14
15	9.4	28	26	......	114	702	438	174	173	76	12
16	9.4	23	......	......	87	712	436	169	177	72	12
17	9.4	18	......	......	80	726	436	157	182	54	12
18	9.8	19	......	......	79	734	428	150	186	32	12
19	9.8	22	......	......	80	746	408	146	191	26	12
20	9.8	21	......	......	121	760	436	148	195	21	14
21	9.4	21	......	124	281	768	430	148	200	20	15
22	9.0	22	......	128	321	737	413	119	204	20	18
23	9.4	21	......	123	333	762	359	90	212	19	18
24	9.4	22	......	123	358	765	318	80	212	18	17
25	9.8	21	......	124	383	762	270	76	194	19	17
26	9.8	20	......	137	340	740	210	72	180	19	17
27	10	22	......	130	306	734	212	68	176	18	16
28	10	22	......	128	288	712	264	68	174	18	16
29	11	24	......	124	273	677	459	65	174	18	16
30	11	24	......	......	266	683	441	64	186	18	17
31	11	......	......	......	264	......	398	......	196	18	......

NOTE.—Mean discharge estimated on account of ice as follows: Dec. 16–31, 12 second-feet; Jan. 1–31, 17 second-feet; Feb. 1–20, 85 second-feet. Discharge interpolated July 16–21 and Aug. 13–14.

Monthly discharge of Humboldt River near Oreana, Nev., for year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	11	2.6	7.89	485
November	28	11	17.9	1,070
December	30		18.9	1,160
January			17.0	1,050
February	137		98.0	5,640
March	383	41	166	10,200
April	768	277	622	37,000
May	788	210	491	30,200
June	335	64	153	9,100
July	212	52	152	9,350
August	196	18	61.5	3,780
September	23	12	16.8	1,000
The year	788	2.6	151	110,000

HUMBOLDT RIVER NEAR LOVELOCKS, NEV.

Location.—In NW. ¼ sec. 11, T. 25 N., R. 31 E., 1,500 feet below dam and reservoir on Big 5 ranch, lowest diversion for irrigation on Humboldt River, and 9 miles south of Lovelocks, Humboldt County.

Drainage area.—14,200 square miles.

Records available.—February 7, 1912, to September 30, 1916.

Gage.—Lietz water-stage recorder on left bank on the opposite side of the river and a few feet downstream from inclined gage to which it is referred; inspected by V. A. Westfall. Original inclined staff gage on right bank was read February 7 to June 17, 1912, when Lietz gage was installed a few feet below it; Lietz gage washed out June 18, 1914, and was replaced on left bank June 26, 1914.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Bed is composed of firm clay. Control fairly permanent. One channel at all stages. Stage of zero flow, determined by measurement June 11, 1916, gage height −0.5+0.1 foot.

Extremes of discharge.—Maximum stage for year, from water-stage recorder, 1.29 feet at 2 p. m. March 17 (discharge, 257 second-feet); minimum stage, channel dry May to September.

1912–1916: Maximum stage recorded, 5.15 feet May 4, 1914 (discharge, 1,450 second-feet); minimum stage (channel dry during April, May, and June, 1913, and May to September, 1916).

Ice.—Stage-discharge relation not affected by ice.

Diversions.—Below all irrigation diversions.

Regulation.—Flow affected by irrigation diversions and storage.

Accuracy.—Stage-discharge relation fairly permanent except at extreme low water; not affected by ice. Rating curve for 1915 fairly well defined between 0 and 250 second-feet was used, as no measurements were made during period of flow in 1916. Operation of water-stage recorder satisfactory except for breaks in record as shown in footnote to daily-discharge table. Daily discharge determined by applying to rating table mean daily gage height obtained by inspecting recorder graph. Records fair for period of flow during February and March.

The following discharge measurement was made by A. B. Purton:

November 17, 1915: Gage height, −0.01 foot; discharge (estimated), 0.10 second-feet.

Daily discharge, in second-feet, of Humboldt River near Lovelocks, Nev., for the year ending, Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	0.4	0.1	0.1	0.1	....	6	0.1
2	.5	.1	.1	.1	....	6	.1
3	.1	.1	.1	.1	....	6	.1
4	.1	.1	.1	.1	....	6	.1
5	.1	.1	.1	.1	48	9	.1
6	.1	.1	.1	.1	....	10	.1
7	.1	.1	.2	.1	....	....	.1
8	.1	.1	.2	.1	....	....	.1
9	.1	.1	.3	.1	....	....	.1
10	.2	.1	.3	.1	....	....	.1
11	.2	.1	.4	.1	....	25	.1
12	.2	.1	.4	.1	41	20	.1
13	.2	.1	.4	.1	41	16	.1
14	.2	.1	.3	.1	48	13	.1
15	.2	.1	.3	.1	54	13	.1
16	.2	.1	.2	.1	92	13	.1
17	.1	.1	.2	.1	114	119	.1
18	.1	.1	.1	.1	106	.6	.1
19	.1	.1	.1	.1	109	.4	.1
20	.1	.1	.1	.1	109	.4	.1
21	.1	.1	.1	.1	146	.4	.1
22	.1	.1	.1	.2	167	.4	.1
23	.1	.1	.1	.2	....	.4	.1
24	.1	.1	.1	.2	....	.2	.1
25	.1	.1	.1	.2	....	.1	.1
26	.1	.1	.1	.2	58	.1	.1
27	.1	.1	.1	.2	47	.1	.1
28	.1	.1	.1	.2	36	.1	.1
29	.1	.1	.1	.2	20	.1	.1
30	.1	.1	.1	.2	....	.1	.1
31	.1	....	.1	.2	....	.1	....

NOTE.—Mean discharge interpolated on account of breaks in recording-gage record as follows: Feb. 1–4, 24 second-feet; Feb. 6–11, 44 second-feet; Feb. 23–25, 112 second-feet; Mar. 7–10, 18 second-feet. River was dry on June 11, water standing in pools, and has been assumed so from May 1 to Sept. 30.

Monthly discharge of Humboldt River near Lovelocks, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0.5	0.1	0.145	9
November	.1	.1	.100	6
December	.4	.1	.168	10
January	.2	.1	.132	8
February	167	....	66.6	3,830
March	119	.1	10.9	670
April	.1	.1	.100	6
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
The year	167	0	6.25	4,540

STARR CREEK NEAR DEETH, NEV.

Location.—In NE. ¼ sec. 12, T. 36 N., R. 59 E., at highway bridge, 2 miles above mouth and about 3 miles southeast of Deeth, Elko County; below all large tributaries except Boulder Creek.

Drainage area.—Not measured.

Records available.—June 4, 1913, to September 30, 1916.

Gage.—Vertical staff nailed to upstream pile of bridge bent near right bank; read by G. E. Weathers. Datum of gage raised 1.00 foot August 23, 1916.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of small gravel. Control is gravel bar; shifts occasionally. One channel except at extremely high stages, when part of the flow passes under an auxiliary bridge.

Extremes of discharge.—Maximum stage recorded during year, 4.05 feet June 17 and 18 (discharge, 126 second-feet); minimum stage, 1.42 feet August 23 to September 1 and September 6 (discharge, 1.3 second-feet).

1913–1916: Maximum stage recorded, 5.6 feet June 4, 1914 (discharge, 372 second-feet); minimum stage, 1.42 feet August 23 to September 1 and September 6, 1916 (discharge, 1.3 second-feet).

Ice.—Stage-discharge relation slightly affected by ice.

Diversions.—Station is below practically all diversions from Starr Creek.

Regulation.—Some variation in daily flow at times caused by diversions for irrigation.

Accuracy.—Stage-discharge relation permanent; affected by ice November 14, December 29 to January 10, and January 14 to February 6. Rating curve well defined between 0 and 150 second-feet. Gage read to quarter-tenths three or four times a week. Daily discharge determined by applying daily gage height to rating table and by interpolation for days when gage was not read, except during period affected by ice, when it was estimated from observer's notes, weather records, and two discharge measurements. Records fair.

Discharge measurements of Starr Creek near Deeth, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 14a	A. B. Purton	2.75	9.1
Jan. 6a	L. W. Jordan	2.81	8.0
May 1	do	2.87	15.9
June 20	L. W. Jordan	3.93	112
Aug. 23	do	b 2.42	1.3

a Frozen over at gage; control about half open.

b Gage height referred to new datum, 1.42 feet.

Daily discharge, in second-feet, of Starr Creek near Deeth, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.8	6.4	8.0	......	......	11	34	16	16	55	3.6	1.3
2	4.8	6.4	8.0	......	......	10	32	15	17	60	3.6	1.5
3	4.8	6.4	8.0	......	......	10	30	14	17	60	3.6	1.7
4	4.8	6.4	8.0	......	......	10	30	16	17	55	3.6	1.6
5	4.8	6.4	8.0	......	......	10	30	17	18	50	3.6	1.4
6	4.8	6.4	8.0	8	......	10	32	17	20	46	3.6	1.3
7	4.8	6.4	8.0	......	8	11	31	17	34	44	2.4	4.8
8	4.8	6.4	8.0	......	9	12	30	17	55	42	2.4	4.3
9	4.8	6.4	8.0	......	10	14	26	17	70	42	2.4	4.3
10	4.8	6.4	8.0	......	11	34	26	17	85	39	2.4	4.6
11	4.8	6.4	8.0	6.4	12	42	28	16	85	36	2.4	4.8
12	4.8	6.4	8.0	6.4	11	50	30	14	90	34	2.4	4.8
13	4.8	6.4	8.0	6.4	10	50	30	14	96	30	4.8	4.8
14	4.8	9.1	7.7	......	10	50	30	14	102	26	4.8	4.8
15	4.8	8.2	7.4	......	10	46	30	14	108	22	4.8	4.8
16	6.4	7.4	7.4	......	10	46	30	14	117	18	4.8	4.8
17	6.4	7.4	7.4	......	10	46	30	12	126	14	4.8	4.8
18	6.4	7.4	7.4	......	10	48	30	12	126	14	4.8	4.8
19	6.4	7.4	7.4	......	10	50	30	12	120	14	4.8	4.8
20	6.4	7.4	7.7	......	10	52	28	12	114	13	4.8	4.8
21	6.4	7.4	8.0	......	16	55	26	12	74	12	4.8	4.8
22	6.4	8.0	9.0	......	23	60	26	12	69	12	4.8	4.8
23	6.4	8.0	10.0	......	22	53	26	12	64	12	1.3	4.8
24	6.4	8.0	8.0	......	20	46	26	20	60	12	1.3	4.8
25	6.4	8.0	8.0	......	17	43	24	80	60	12	1.3	4.8
26	6.4	8.0	8.0	......	14	40	23	53	58	12	1.3	4.8
27	6.4	8.0	8.0	......	14	38	23	26	55	12	1.3	4.8
28	6.4	8.0	8.0	......	13	36	23	23	55	12	1.3	4.8
29	6.4	8.0	......	......	12	34	23	18	55	12	1.3	4.8
30	6.4	8.0	......	......	......	34	20	14	55	12	1.3	4.8
31	6.4	......	......	......	......	34	......	14	......	7.8	1.3	......

NOTE.—Mean discharge estimated, on account of ice, as follows: Dec. 29 to Jan. 5, 8 second-feet; Jan. 7–10, 7 second-feet; Jan. 14–31, 5 second-feet; Feb. 1–6, 6 second-feet.

Monthly discharge of Starr Creek near Deeth, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	6.4	4.8	5.63	346
November	9.1	6.4	7.23	430
December	10	7.4	7.98	491
January	....	....	5.97	367
February	23	....	11.3	650
March	60	10	35.0	2,150
April	34	20	27.9	1,660
May	80	12	18.7	1,150
June	126	16	67.9	4,040
July	60	7.8	27.2	1,670
August	4.8	1.3	3.09	190
September	4.8	1.3	4.09	243
The year	126	1.3	18.5	13,400

MARYS RIVER NEAR DEETH, NEV.

LOCATION.—In NW. ¼ sec. 31, T. 40 N., R. 60 E., at bridge 300 feet east of Mala Vista ranch house of Nevada Land & Livestock Co., and 20 miles north of Deeth, Elko County.

DRAINAGE AREA.—355 square miles (measured on map of Nevada issued by General Land Office, edition of 1908).

RECORDS AVAILABLE.—November 24, 1902, to July 14, 1903; January 17, 1912, to September 30, 1916.

GAGE.—Chain gage on upstream side of bridge; read by Jess Larson. Original staff gage at same bridge, but with different datum, read November 24, 1902, to July 14, 1903.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and loose sand; banks below gage subject to caving; control slightly shifting. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.0 feet April 13–15 (discharge, 381 second-feet); minimum stage, 2.24 feet September 26–30 (discharge 1.4 second-feet).

1902–03, 1912–1916: Maximum stage recorded, 6.3 feet May 19 and June 3–7, 1912 (discharge, 439 second-feet); minimum stage, 2.24 feet September 26–30, 1916 (discharge, 1.4 second-feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—Station is below all diversions except one small ditch on the Mala Vista ranch and the Cross ranch diversions about 14 miles below.

REGULATION.—During low water periods flow is affected by diversion dams above.

ACCURACY.—Stage-discharge relation changed slightly during winter; affected by ice December 16 to February 17 and February 27 to March 11. Rating curve used October 1 to December 15 well defined for range of stage during period; that used February 18 to September 30 well defined below 250 second-feet and poorly defined above. Gage read to even-numbered hundredths once daily. Daily discharge determined by applying daily gage height to rating tables. Records good except for high stages for which the rating curve is poorly defined.

Discharge measurements of Marys River near Deeth, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 13[a]	A. B. Purton	2.46	8.8	June 19	L. W. Jordan	4.30	152
Jan. 5[b]	L. W. Jordan	3.40	12.0	Aug. 23	.....do	2.34	2.9
May 2	.....do	4.82	217				

[a] Shore ice.

[b] Frozen over; water 0.2 feet deep on top of ice.

Daily discharge, in second-feet, of Marys River near Deeth, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.5	11	14	......	......	189	236	111	42	7.3	2.5
2	1.5	11	15	......	......	241	217	111	42	7.3	2.5
3	1.5	11	15	......	......	254	233	111	41	6.6	2.5
4	1.5	11	15	......	......	254	250	111	40	6.6	2.5
5	1.5	11	15	......	......	267	267	121	39	6.6	2.5
6	1.5	11	15	......	......	267	281	131	37	5.9	2.0
7	1.5	11	15	......	......	267	309	142	36	5.2	2.0
8	1.5	11	15	......	......	267	309	153	35	5.2	2.0
9	1.5	11	15	......	......	281	309	177	34	4.5	2.0
10	3	11	15	......	......	295	309	189	41	4.5	2.0
11	3	11	15	......	......	309	281	202	41	4	2.0
12	5	11	15	......	57	323	267	202	39	4	2.0
13	5	10	16	......	72	381	267	177	38	4	2.0
14	5	10	16	......	86	381	189	165	34	4	2.0
15	8	9.8	16	......	101	381	165	165	33	4	2.0
16	8	9.8	......	......	118	337	131	165	33	4	2.0
17	8	10	......	......	135	309	131	165	33	4	1.8
18	8	10	......	23	153	309	131	165	31	3.5	1.8
19	8	10	......	24	171	309	131	153	30	3.5	1.8
20	8	11	......	24	189	295	131	142	30	3.5	1.8
21	8	12	......	25	202	254	131	131	29	3.5	1.8
22	8	12	......	27	215	241	131	131	28	3	1.8
23	8	12	......	29	215	228	142	121	27	3	1.8
24	8	13	......	31	215	228	142	111	24	3	1.6
25	8	13	......	33	202	241	131	54	22	3	1.6
26	8	13	......	35	177	254	121	52	18	2.5	1.4
27	8	13	......	......	165	254	111	52	16	2.5	1.4
28	8	14	......	......	189	254	111	46	14	2.5	1.4
29	8	14	......	......	189	254	111	45	11	2.5	1.4
30	8	14	......	......	189	254	111	45	10	3	1.4
31	8	......	......	......	189	......	111	......	8.8	2.5	......

NOTE.—Mean discharge estimated on account of ice as follows: Dec. 16–31, 13 second-feet; Jan. 1–31, 12 second-feet; Feb. 1–17, 15 second-feet, 27–29, 40 second-feet; Mar. 1–11, 50 second-feet. Discharge interpolated Oct. 1–2, Nov. 19, 21–23, 25, 27–28, Dec. 1–2, 4, 6–7, 9, 11–13, Mar. 13–14, 16–17, 19, 21, May 1–4, July 4–8.

Monthly discharge of Marys River near Deeth, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	8	1.5	5.50	338
November	14	9.8	11.4	678
December	16	....	14.0	861
January	....	....	12.0	738
February	....	....	21.6	1,240
March	215	....	122	7,500
April	381	189	279	16,600
May	309	111	190	11,700
June	202	45	128	7,620
July	42	8.8	30.2	1,860
August	7.3	2.5	4.17	256
September	2.5	1.4	1.91	114
The year	381	1.4	68.2	49,500

LAMOILLE CREEK NEAR LAMOILLE, NEV.

LOCATION.—In sec. 6, T. 32 N., R. 58 E., about 50 feet below tailrace of Elko-Lamoille Power Co.'s plant, 50 feet above first irrigation diversion, about 2 miles above Lamoille and 22 miles southeast of Elko, Elko County.

DRAINAGE AREA.—About 14 square miles (measured on maps issued by United States Forest Service).

RECORDS AVAILABLE.—May 8, 1915, to September 30, 1916.

GAGE.—Vertical staff on left bank, read by E. Galloway.

DISCHARGE MEASUREMENTS.—Made from cable, footbridge at gage, or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and large boulders. Control shifts at extremely high water. One channel at all stages.

Extremes of discharge.—1915–16: Maximum stage recorded during year, 2.06 foot at 7 p. m. June 17, 1916 (discharge, 330 second-feet); minimum stage, 0.48 foot December 29, 1915, and January 20 and 21, 1916 (discharge, 2 second-feet).

Ice.—Stage-discharge relation not seriously affected by ice.

Diversions.—Above all irrigation diversions. Water is diverted for Elko-Lamoille Power Co. plant, but returned to stream about 50 feet above gage.

Regulation.—A daily fluctuation occurs on days when power plant is not in continuous operation.

Accuracy.—Stage-discharge relation changed during high water in June; not seriously affected by ice. Rating curves well defined between 0 and 250 second-feet. Gage read to hundredths twice daily. On days when power plant is operated part time mean gage height determined by weighting readings. Daily discharge determined by applying mean daily gage height to rating tables; interpolated for days when stage-discharge relation was affected by ice. Shifting-control method used June 3–16. Records good.

Discharge measurements of Lamoille Creek near Lamoille, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 10[a]	A. B. Purton	0.52	2.7	Apr. 18	L. W. Jordan	1.00	34.2
Jan. 4[b]	L. W. Jordan	.56	3.4	June 28	do	1.93	253
Mar. 23	do	.87	21.3	Sept. 3	do	.90	9.3

[a] Zero flow estimated at gage height 0.2±.1.

[b] Frozen over at gage; riffle open.

Daily discharge, in second-feet, of Lamoille Creek near Lamoille, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.5	3.5	3.2		2.9	5.5	20	74	79	201	46	11
2	3.5	2.9	3.2		2.9	5.5	21	77	84	179	44	10
3	3.8	2.9	3.2		2.9	6.4	20	95	95	142	41	10
4	4.2	3.5	3.5		2.7	6.4	21	116	122	156	38	10
5	4.2	3.5	3.5		2.5	6.4	21	125	168	175	36	10
6	4.2	3.5	3.5		2.4	9.1	21	146	190	183	33	8.4
7	4.2	3.5	3.5	2.9	2.2	7.3	20	128	208	175	31	9.2
8	4.2	3.5	3.5	2.9	2.2	6.4	21	146	234	211	31	8.4
9	4.2	3.8	3.5	2.9	2.2	6.8	21	132	234	183	28	7.9
10	4.2	3.5	3.5	2.9	2.2	8.2	24	125	239	164	27	8.4
11	4.2	3.6	3.2	2.5	2.2	8.2	27	119	224	148	24	8.4
12	4.2	3.8	3.0	3.0	2.1	8.2	26	108	199	142	22	7.4
13	4.2	3.5	2.9	3.5	2.2	11	26	99	218	138	22	7.4
14	4.2		2.5	3.5	2.3	11	26	90	224	122	20	6.9
15	4.5			3.5	2.5	11	28	90	224	111	19	7.4
16	4.2			2.9	2.7	12	30	95	224	122	18	6.4
17	4.5			2.7	2.9	13	32	95	259	116	18	6.4
18	4.2	3.5	2.5	2.5	5.5	15	34	97	259	90	16	6.4
19	4.2	3.8	2.5	2.2	3.5	15	34	97	230	86	15	6.4
20	4.2	3.8	3.5	2.0	3.2	19	32	86	187	84	15	6.4
21	4.2	3.8	3.2	2.0	5.5	19	32	86	148	82	14	7.4
22	4.5	3.8	3.5	2.1	6.4	19	34	81	122	82	13	7.4
23	5.5	3.8	3.8	2.2	5.5	22	35	77	132	73	12	8.4
24	7.3	3.8	3.4	2.2	7.3	20	44	77	148	66	11	7.4
25	6.8	3.8	2.9	2.2	5.5	19	54	74	168	77	12	7.4
26	4.8	3.8	4.2	2.2	5.5	19	67	72	187	59	11	6.4
27	3.5	3.7	4.2	2.5	3.5	20	74	68	225	52	11	7.4
28	4.2	3.6	4.2	2.6	7.8	20	81	70	225	49	12	6.9
29	3.5	3.5	2.0	2.8	5.5	20	74	77	211	46	14	6.4
30	3.5	3.2	2.2	2.9		20	72	81	187	45	13	8.4
31	3.5		2.9	2.9		20		81		46	12	

Note.—Discharge interpolated because of ice Nov. 11, 14–17, 3.5 second-feet; Nov. 24–25, 27–28, Dec. 1, 12, 15–17, 2.5 second-feet; Dec. 24, 27, Jan. 1–6, 3.0 second-feet; also interpolated for days when gage was not read during January and February. Discharge June 3–16 determined by shifting-control method.

Monthly discharge of Lamoille Creek near Lamoille, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	7.3	3.5	4.33	266
November	3.8	2.9	3.56	212
December	4.2	2.0	3.17	195
January	3.5	2.0	2.73	168
February	7.8	2.1	3.68	212
March	22	5.5	13.2	812
April	81	20	35.7	2,120
May	146	68	96.3	5,920
June	259	79	188	11,200
July	211	45	116	7,130
August	46	11	21.9	1,350
September	11	6.4	7.88	469
The year	259	2.0	41.4	30,100

LAMOILLE CREEK NEAR HALLECK, NEV.

Location.—In NW. ¼ sec. 9, T. 35 N., R. 58 E., half a mile below mouth of Secret Creek, largest tributary, 1½ miles south of Halleck, Elko County, on Southern Pacific Railroad, and 2 miles above confluence with Humboldt River.

Drainage area.—245 square miles.

Records available.—May 12, 1913, to September 30, 1916.

Gage.—Vertical staff on left bank, 200 feet below ford, read by J. H. Lee and R. W. Randolph. Datum lowered 1.00 foot August 19, 1915.

Discharge measurements.—Made from cable 200 feet above gage or by wading.

Channel and control.—Bed composed of gravel. Control is gravel bar, which shifts occasionally and at times is affected by beaver dams. Channel very crooked; both banks overflowed during floods.

Extremes of discharge.—Maximum stage recorded during year, 5.92 feet March 8 (discharge, 201 second-feet); creek dry October 1–26 and August 6, to September 30.

1913–1916: Maximum stage recorded, 6.7 feet June 5, 1914 (discharge, 556 second-feet); minimum stage (creek dry in August and September, 1915, and in October, August and September, 1916).

Ice.—Stage-discharge relation seriously affected by ice.

Diversions.—Below all diversions except one small ditch.

Regulation.—Flow affected by irrigation diversions above.

Accuracy.—Stage-discharge relation changed slightly during winter; affected by backwater from a beaver dam October 29, to December 31, and by ice December 13 to February 6. Rating curves fairly well defined for range in stage. Gage read to hundredths three times a week. Daily discharge determined by applying gage heights to rating tables and interpolating for days when gage was not read, except for periods when stage-discharge relation was affected. Records obtained by use of rating tables good; others fair.

Discharge measurements of Lamoille Creek near Halleck, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 14[a]	A. B. Purton	3.77	3.0	May 2	L. W. Jordan	4.05	18.9
Jan. 5[b]	L. W. Jordan	4.24	11.4	June 19	do	5.80	183

[a] Frozen over at gage; riffle partly open. [b] Complete ice cover at gage; small channel open at riffle.

Daily discharge, in second-feet, of Lamoille Creek near Halleck, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1			10		170	66	19	19	89	2.2
2			10		172	62	19	18	91	1.6
3			11		185	58	20	18	88	1.0
4			11		198	56	21	17	84	.6
5			10		198	55	20	16	81	.1
6			10		198	55	20	18	81	
7			11	31	200	55	24	19	81	
8			11	31	201	56	27	37	61	
9			11	32	190	54	26	55	49	
10			11	34	174	53	25	63	37	
11			12	37	159	54	24	72	33	
12			11	39	121	55	22	81	29	
13				42	83	55	21	91	28	
14		5.6		46	78	55	21	101	27	
15		4.6		48	72	55	21	120	26	
16		4.6		49	77	48	23	139	24	
17		4.6		71	79	40	25	159	21	
18		5.8		110	81	40	26	172	20	
19		6.9		149	76	41	26	185	19	
20		6.9		152	72	40	27	176	18	
21		6.9		155	72	40	22	167	17	
22		6.9		152	72	33	16	159	16	
23		6.9		149	74	30	24	139	15	
24		15.0		162	76	27	33	119	14	
25		23.0		175	77	24	55	108	13	
26		10.0		188	74	21	56	97	12	
27	1.0	6.3		176	76	21	58	99	11	
28	2.0	6.3		164	75	21	45	101	10	
29	3.2	8.0		167	74	20	33	89	7.6	
30	3.2	9.8			74	20	21	89	5.2	
31	3.2				70		20		2.8	

NOTE.—Mean discharge estimated as follows: Nov. 1–13 on account of beaver dam, 4.4 second-feet; on account of ice Dec. 13–31, 10 second-feet; Jan. 1–31, 11 second-feet; Feb. 1–6, 12 second-feet. Zero discharge Oct. 1–26 and Aug. 6 to Sept. 30.

Monthly discharge of Lamoille Creek near Halleck, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	3.2	0	0.41	25
November	23		6.51	387
December			10.3	633
January			11.0	676
February	188		83.8	4,820
March	201	70	116	7,130
April	66	20	43.7	2,600
May	58	16	27.1	1,670
June	185	16	91.4	5,440
July	91	2.8	35.8	2,200
August	2.2	0	.18	11
September	0	0	0	0
The year	201	0	32.5	25,600

NORTH FORK OF HUMBOLDT RIVER AT DEVILS GATE, NEAR HALLECK, NEV.

LOCATION.—In sec. 13, T. 38 N., R. 57 E., at narrows about 3½ miles above buildings of Morgan Hill ranch (also known as Devils Gate ranch), 17 miles north of Halleck, Elko County, and 27 miles by wagon road from Elko.

DRAINAGE AREA.—830 square miles (measured on General Land Office maps).

RECORDS AVAILABLE.—November 11, 1913, to September 30, 1916; also at mouth of stream from October 10, 1902, to December 31, 1909, and October 1, 1910, to December 31, 1913.

GAGE.—Stevens continuous water-stage recorder on right bank; inspected by John Taylor. Original gage was about 15 miles downstream, comparatively little run-off entering below the present station except during storms.

DISCHARGE MEASUREMENTS.—Made from cable about 30 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of sand with gravel riffle at control; about half of the control section is affected by growth of moss. Channel crooked; banks comparatively high and covered with willows; at extremely high stages water may overflow right bank and pass in an overflow channel around gage. Gage height of zero flow, about 0.7 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.05 feet at 5 p. m. April 3 (discharge, 632 second-feet); minimum stage, from water-stage recorder, 1.16 feet at 4 p. m. August 20 (discharge 5.4 second-feet).

1913–1916: Maximum stage recorded, 7.23 feet April 7, 1914 (discharge, 722 second-feet); minimum discharge, 1 second-foot August 20–28 and September 30, 1913 (stage, 2.5 feet).

ICE.—Stage-discharge relation seriously affected by ice; river freezes over at gage, but riffle is sometimes partly open; anchor ice collects on riffle.

DIVERSIONS.—Numerous diversions in the valley above and below the Devils Gate. During the summer almost all low-water flow is diverted.

REGULATION.—Flow during summer depends on amount of irrigation above. A minimum flow is maintained from seepage and springs.

ACCURACY.—Stage-discharge relation affected by moss on control during low water; fairly permanent at high stages; seriously affected by ice during winter. Rating curve used during October well defined between 0 and 250 second-feet; curves used remainder of year fairly well defined between 50 and 400 second-feet. Operation of water-stage recorder satisfactory except for breaks in record as shown in footnote to daily discharge table. Daily discharge ascertained by applying to rating tables, the mean daily gage height determined by inspecting recorder graph, except for periods when stage-discharge relation was affected by ice or shifting control. Records obtained by use of tables good; others fair.

Discharge measurements of North Fork of Humboldt River at Devils Gate near Halleck, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 13	A. B. Purton	[a] 1.87	17.7	May 1	L. W. Jordan	4.30	286
Jan. 6	L. W. Jordan	[b] 1.70	18.4	June 19	.....do	2.37	84
Mar. 25	.....do	[c] 5.23	384	Aug. 22	.....do	1.22	7.1

[a] Shore ice at control and anchor ice. Moss on riffle.
[b] Open channel in center. Shore ice both sides.
[c] Wire fence across stream 300 feet below collects drift.

Daily discharge, in second-feet, of North Fork of Humboldt River at Devils Gate near Halleck, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6.0	13	18	....	381	285	118	57	16	11
2	5.8	14	20	....	483	273	110	60	14	10
3	5.8	14	21	....	600	256	108	63	14	9
4	5.9	15	22	....	600	250	104	66	13	9
5	6.0	16	21	....	574	244	97	77	11	9
6	6.3	16	21	....	522	256	93	70	11	9.4
7	6.3	17	21	....	444	256	90	63	11	9.8
8	6.3	17	21	....	405	250	95	60	11	9.4
9	6.3	18	20	....	431	244	93	55	10	9.4
10	6.7	18	20	....	483	239	95	51	10	9.8
11	7.1	18	20	....	561	228	96	42	10	9.8
12	7.5	19	16	....	613	217	100	37	10	10
13	7.9	18	20	....	496	206	102	35	10	11
14	8.3	18	24	....	405	195	102	34	10	11
15	8.7	18	....	....	405	184	95	30	9	11
16	9.1	18	....	....	393	173	93	31	9	11
17	9.5	18	....	....	381	162	90	33	7	11
18	9.5	18	....	....	369	152	86	30	6.6	10
19	9.0	18	....	....	357	147	84	27	5.8	10
20	9.0	20	....	....	333	142	89	26	5.8	10
21	9.0	20	....	....	321	142	108	24	5.8	11
22	10.0	20	....	....	303	132	124	23	7.4	11
23	10.0	20	....	....	291	128	126	24	7.8	11
24	9.0	20	....	470	285	132	116	24	8.2	12
25	10.0	20	....	405	291	157	103	25	8.2	12
26	12.0	20	....	393	303	195	92	24	8.6	11
27	11.0	19	....	381	315	222	82	24	8.6	11
28	10.0	18	....	431	315	206	74	22	8.6	11
29	12.0	19	....	509	315	168	66	20	9.0	11
30	12.0	19	....	470	297	139	59	19	9.8	11
31	12.0	....	....	381	....	126	....	18	11	....

NOTE.—Mean discharge estimated on account of ice and breaks in recording gage record from observer's notes, weather records, two discharge measurements, and comparison with record for Mary's River near Deeth, as follows: Dec. 15–31, 16 second-feet; Jan. 1–31, 15 second-feet; Feb. 1–19, 20 second-feet; Feb. 20 to Mar. 8, 30 second-feet; Mar. 9–20, 275 second-feet; Mar. 21–23, 525 second-feet. Discharge interpolated Oct. 10–16; determined by shifting-control method Nov. 1–12 and Aug. 1–20.

Monthly discharge of North Fork of Humboldt River near Halleck, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	12	5.8	8.52	524
November	....	13	17.9	1,070
December	24	....	18.0	1,110
January	....	....	15.0	922
February	....	....	23.4	1,350
March	....	....	276	17,000
April	613	285	409	24,300
May	285	126	197	12,100
June	126	59	96.3	5,730
July	77	18	38.5	2,370
August	16	5.8	9.59	590
September	12	9	10.4	619
The year	613	5.8	93.2	67,700

SOUTH FORK OF HUMBOLDT RIVER NEAR ELKO, NEV.

LOCATION.—In sec. 19, T. 33 N., R. 55 E., at head of canyon below Cowling's ranch, 4 miles above mouth and 10 miles southwest of Elko, Elko County.

DRAINAGE AREA.—Not measured (1,150 square miles at old station 1½ miles above).

RECORDS AVAILABLE.—August 29, 1896, to December 31, 1909; September 9, 1910, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank 1½ miles below highway bridge, November 14, 1913, to September 30, 1916; inspected by Harry Cowling. Inclined staff on left bank one-fourth mile above bridge, February 26, 1907, to November 13, 1913; prior to February, 1907, several gages at slightly different sites and datums.

DISCHARGE MEASUREMENTS.—Made from cable just below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Rock riffle a short distance below gage affords fairly permanent control. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.05 feet at 1 p. m. June 18 (discharge, 438 second-feet); channel dry October 1–11 and September 10–30.

1896–1916: Maximum stage recorded, 10.0 feet January 26, 1914 (discharge, 2,400 second-feet); channel dry in August, September, and October, 1915, and September, 1916.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Below all tributaries and all diversions except those of Hunter & Banks ranch 3 miles downstream.

REGULATION.—Flow affected by diversions above.

ACCURACY.—Stage-discharge relation changed slightly during year; affected by ice during January and February. Rating curve well defined between 0 and 1,200 second-feet. Operation of water-stage recorder satisfactory except for breaks in record shown in footnote to table of daily discharge. Daily discharge ascertained by applying to rating tables the mean daily gage height determined by inspecting recorder graph, except during periods when stage-discharge relation was affected by ice or the gage height record was missing. Records obtained by use of rating table good, others fair.

Discharge measurements of South Fork of Humboldt River near Elko, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 9[a]	A. B. Purton	0.54	7.7	May 13	L. W. Jordan	1.86	155
Dec. 14[b]	L. W. Jordan	.71	13.7	June 18	.....do	3.03	439
Jan. 7[c]	.....do	.75	9.7	Aug. 14	.....do	.03	0.7
Mar. 22[d]	.....do	2.91	365				

[a] Stage of zero flow determined zero on gage.
[b] Slight shore ice.
[c] Complete ice cover at gage; control partly open.
[d] Some driftwood lodged on control.

Daily discharge, in second-feet, of South Fork of Humboldt River near Elko, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		7.4	13		159	182	64	137		1.0
2		7.7	12		170	178	66	136		.8
3		7.7	12		170	178	62	174		.6
4		7.4	12		172	186	65	139		.6
5		7.1	13		167	214	90	122		.5
6		7.4	13		157	217	139	116		.5
7		7.7	12		152	228	176	107		.3
8		7.4	12		150	243	206	105	0.7	.2
9		7.7	12		152	245	258	103	.7	.1
10		8.0	12		163	208	292		.7	.0
11	0.0	7.4	13		199	193	314		.7	
12	.2	8.0	12		240	174	312		.7	
13	.9	7.4	14		226	156	312		.7	
14	1.3	6.5	13		199	139	332		.6	
15	2.8	8.6	11	90	182	129	344		.7	
16	2.4	9.2	9.2	148	178	108	350		.6	
17	3.3	9.5	8.9	205	176	92	347		.6	
18	3.6	8.9	6.8	263	174	87	388		.6	
19	3.8	13.0	4.5	320	184	134	353		.5	
20	4.2	11.0	9.5	334	180	116	312		.5	
21	4.5	11.0	9.5	348	172	93	265		.5	
22	5.2	10.0	11	362	159	80	208	33	.5	
23	4.8	9.5	16	318	147	65	167		.5	
24	4.5	11.0	12	273	137	80	150		.4	
25	5.5	6.5	11	228	145	167	147		.4	
26	6.2	12.0	10	233	163	188	159		.4	
27	6.5	9.5		226	182	149	172		.5	
28	6.5	13.0		219	188	120	188		.5	
29	6.8	16.0		210	184	103	168		.6	
30	7.1	14.0		184	178	89	145		.7	
31	7.1			168		73			1.0	

NOTE.—Discharge obtained as follows: Interpolated because of missing gage height record, Dec. 27–31, 10 second-feet; Mar. 6–14, 70 second-feet; July 10–21, 68 second-feet; July 23–31, 18 second-feet; Aug. 1–7, 2 second-feet; estimated on account of ice, from observer's notes, one discharge measurement, and study of North Fork Humboldt and Humboldt at Palisade records: Jan. 1 to Feb. 15, 10 second-feet; Feb. 16–29, 20 second-feet; Mar. 1–5, 30 second-feet. Zero discharge Oct. 1–11, and Sept. 10–30.

Monthly discharge of South Fork of Humboldt River near Elko, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	7.1	0	2.81	173
November	13	7.1	9.25	550
December	16	4.5	11.1	682
January			10	615
February			14.8	851
March	362		158	9,720
April	240	137	174	10,400
May	245	65	149	9,160
June	388	62	218	13,000
July	174		69.4	4,270
August		.4	.913	56
September	1	0	.153	9
The year	388	0	68.1	49,500

MAGGIE CREEK AT CARLIN, NEV.

LOCATION.—In sec. 26, T. 33 N., R. 52 E., 500 feet above highway bridge, half a mile above confluence with Humboldt River, and half a mile east of Carlin, Elko County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 6, 1913, to September 30, 1916.

GAGE.—Inclined staff on left bank about 600 feet above Pacific Fruit Express Co.'s dam, October 26, 1913, to September 30, 1916; vertical staff at the bridge 100 feet above dam June 6 to October 25, 1913. Read by B. L. Hale and J. F. Robinson.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifts occasionally. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.09 feet April 11 (discharge, 183 second-feet); minimum discharge not determined.

1913-1916: Maximum stage recorded, 4.5 feet April 28, 1914 (discharge, 394 second-feet); minimum stage, 0.95 foot August and September, 1915 (discharge, 0.1 second-foot).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation changed during high water in March and April; affected by backwater from dam and ice on control November 20 to February 5, and from dam April 28 to May 1. Rating curves fairly well defined for range of stage during periods used. Gage read to hundredths twice daily but readings not always reliable, and from May 4 to September 30 were considered of no value. Daily discharge determined by applying mean daily gage height to rating tables except during periods when stage-discharge relation was affected by ice, backwater from dam, or shifting control. See footnote to daily discharge table. Records obtained by use of rating tables fair; others poor.

Discharge measurements of Maggie Creek at Carlin, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 7 [a]	1.60	1.7	May 3	2.36	114	June 27	1.00	15.8
Mar. 9	1.92	14.7	June 15	1.20	27.6	Aug. 28	.37	1.5

[a] Incomplete ice cover at control.

Daily discharge, in second-feet, of Maggie Creek at Carlin, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	Aug.
1	2.6	6.1			129	118		
2	2.6	4.3			137	118		
3	3.1	3.7			141	111		
4	3.1	4.3			147			
5	3.7	5.2		13	152			
6	3.7	5.2	2.2	13	157			
7	3.7	5.2	2.2	14	162			
8	4.3	4.3	2.2	15	168			
9	3.7	5.2	1.8	15	174			
10	3.7	3.7	1.8	15	179			
11	5.2	3.1	3.7	16	183			
12	4.3		6.1	16	182			
13	5.2		8.8	16	182			
14	7.4		12	16	181			
15	5.2		14	17	180		25	
16	6.1		18	17				
17	5.2		14	17				
18	6.1		12	18				
19	7.4		8.8	18				
20	5.2		8.8	22				
21	7.4		7.4	22				
22	7.4		7.4	27				
23	6.1			34	131			
24	7.4			37	127			
25	5.2			54	121			
26	6.1			62	121			
27	7.4			78	121		16	
28	4.3			86	120			1.7
29	4.3			96	120			
30	6.1			118	119			
31	5.2			123				

NOTE.—Mean discharge estimated on account of ice and backwater from temporary dam as follows:

	Second-feet.		Second-feet.
Nov. 12–30	3	Feb. 1–5	2
Dec. 1–31	2	Feb. 23 to Mar. 4	10
Jan. 1–31	1		

Interpolated because of unreliable gage readings:

	Second-feet.		Second-feet.
Apr. 16–20	155	June 28–30	16
May 4–31	83	July 1–31	12
June 1–14	39	Aug. 1–27	5
June 16–26	20		

Estimated because of unreliable gage readings:

	Second-feet.		Second-feet.
Aug. 29–31	1.5	Sept. 1–30	1

Monthly discharge of Maggie Creek at Carlin, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	7.4	2.6	5.11	314
November			3.58	213
December			2.00	123
January			1.00	61.5
February	18		7.28	419
March	123		33.4	2,050
April	183	119	151	8,980
May	118		86.2	5,300
June			28.5	1,700
July			12.0	738
August			4.55	280
September			1.00	59.5
The year	183		27.8	20,200

ROCK CREEK AT ROCK CREEK RANCH, NEAR BATTLE MOUNTAIN, NEV.

LOCATION.—Approximately in sec. 6, T. 37 N., R. 47 E., at old footbridge about a mile above diversion dam at mouth of canyon, 1½ miles above Rock Creek ranch house, a few miles south of Dutton, and 35 miles north of Battle Mountain, Lander County. Willow Creek is the only large tributary between this station and the one maintained several miles below in 1896.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 13, 1915, to September 30, 1916.

GAGE.—Vertical staff near left end of footbridge; datum raised 0.62 June 14, 1916; read by foreman of Rock Creek ranch.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of rocks and gravel, likely to shift at extremely high stages. One channel at all stages. Banks high and clean.

EXTREMES OF DISCHARGE.—Maximum discharge from discharge measurement, March 21, 1916, 933 second-feet; minimum discharge not determined.

1915–1916: Maximum discharge, same as above; minimum stage recorded, 1.2 feet July 5 and 7, 1915 (discharge, 0.4 second-feet).

DIVERSIONS.—Numerous small diversions above station; there is a small reservoir on one of the tributaries above Squaw Valley.

REGULATION.—Flow affected by diversions and storage above.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined between 0 and 100 second-feet. Gage read three times a week, October 1 to November 2, and once a week, May 12 to September 30. Gage not read November 3 to May 11 except at time of measurement, on March 21. Discharge determined by applying gage heights to rating table. Records fair.

Discharge measurements of Rock Creek at Rock Creek ranch, near Battle Mountain, Nev., during the year ending Sept, 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Mar. 21	6.06	933
May 12	2.82	101
June 14	[a] 1.50	22.4

[a] New datum; 1.50 new=2.12 old.

Daily discharge, in second-feet, of Rock Creek at Rock Creek ranch, near Battle Mountain, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Mar.	May.	June.	July.	Aug.	Sept.
1						85		
2	4.4	4.4						4.9
3					41			
4	4.4							
5							4.9	
6	4.4							
7								
8						45		
9	4.4							4.9
10	4.4				41			
11								
12				101			4.9	
13	4.4							
14					22			
15						28		
16	4.4							4.9
17	4.4				85			
18								
19	4.4						4.9	
20				49				
21	4.4		933					
22						10		
23	4.4							4.9
24	4.4				85			
25								
26	4.4						4.9	
27	4.4			41				
28	4.4							
29						7.3		
30	4.4							
31	4.4							

NOTE.—Daily discharge not determined for periods when gage was not read.

REESE RIVER NEAR BERLIN, NEV.

LOCATION.—In SW. ¼ sec. 16, T. 12 N., R. 40 E., close to boundary of Toiyabe National Forest, just above mouth of Illinois Creek, 1½ miles below Archie Bell's ranch, 2 miles above Bell home ranch, 7 miles east of Berlin, Nye County, and 55 miles south of Austin, Nev.

DRAINAGE AREA.—94 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 10, 1913, to November 10, 1914; March 1 to December 11, 1915, and May 7 to September 30, 1916.

GAGE.—Vertical staff on left bank 300 feet above headgate of the upper Bell ditch, read by Roy Bell; gage 10 feet downstream with datum 1.17 feet higher read June 29, 1915, to September 30, 1916; an auxiliary gage, about 1½ miles below the regular gage, used November 1, 1913, to April 28, 1914, October 20 to November 10, 1914, and March 1 to April 18, 1915, when no water was being diverted between gages.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of sand and small gravel. Stream very crooked. Banks low, covered with a thick growth of willows; subject to overflow at high stages. Control at low stages is fairly well defined gravel riffle a few feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year during period when gage height record was obtained, 2.90 feet May 7 (discharge, 65 second-feet); minimum stage, 0.90 foot September 29 and 30 (discharge, 1.5 second-feet).

ICE.—Station discontinued during winter.

DIVERSIONS.—A small amount of water is diverted at the Archie Bell ranch above the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent. Measurements define a reversed curve, well defined between 0 and 200 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage height to rating table, interpolating discharge for days when gage was not read. Records fair.

The records of daily and monthly discharge for the years 1914 and 1915 are published herewith, recomputed by means of a rating curve developed from all discharge measurements made during the period October 1, 1913, to September 30, 1916.

Discharge measurements of Reese River near Berlin, Nev., during the period Oct. 1, 1913, to Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Oct. 12	J. J. Sanford	[a] 0.99	3.4	June 28	A. B. Purton	1.86	37.4
1914.				28	do	1.86	38.2
May 23	L. W. Jordan	4.20	164.	28	do	[c] 3.22	28.6
July 9	do	1.53	21.3	29	do	1.84	37.9
10	do	1.58	22.2	Sept. 10	do	.91	1.9
1915.				1916.			
Apr. 17	A. B. Purton	2.83	62	May 7	L. W. Jordan	2.89	62
17	do	[b] 2.80	64	June 26	do	1.42	15.3
				Aug. 27	do	.96	3.1

[a] Gage heights refer to datum established June 29, 1915.

[b] Auxiliary gage read 4.30 feet one hour later, with no diversions between gages.

[c] Measurement at auxiliary gage; water being diverted between gages.

Daily discharge, in second-feet, of Reese River near Berlin, Nev., for the years ending Sept. 30, 1914, 1915, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	4.5	5.0	5	7	......	7	17	62	118	29	8.5	3.5
2	4.5	3.5	5	7	......	9	17	59	128	29	8.5	3.5
3	4.5	3.5	5	7	......	11	22	118	118	26	7	3.5
4	4.5	3.5	5	9	......	9	34	118	109	24	5.5	3.5
5	4.5	3.5	5	9	......	9	37	118	114	24	5.5	3.5
6	2.5	3.5	5	9	......	9	34	109	109	22	5.5	3.5
7	2.5	3.5	......	9	......	10	37	101	109	22	5.5	3.5
8	1.0	3.5	......	9	......	11	34	109	101	22	5.5	4.5
9	1.0	3.5	......	......	......	15	34	109	88	22	5.5	3.5
10	2.5	5.0	......	......	......	19	34	114	78	22	5.5	3.5
11	4.5	5.0	......	......	......	22	34	118	73	22	5.5	3.5
12	2.5	3.5	......	......	......	25	34	114	69	19	5.5	3.5
13	2.5	3.5	......	......	......	25	34	118	69	19	7	3.5
14	2.5	3.5	......	......	......	28	40	128	62	19	7	3.5
15	2.5	5.0	......	......	......	31	40	118	59	17	5.5	3.5
16	2.5	5	......	......	......	37	43	151	59	17	5.5	3.5
17	2.5	5	......	......	......	34	57	139	54	19	5.5	3.5
18	2.5	5	......	......	......	34	46	128	52	19	5.5	3.5
19	2.5	5	......	......	......	37	46	123	52	40	5.5	3.5
20	2.5	5	......	......	......	37	53	145	53	47	3.5	3.5
21	2.5	3.5	......	......	......	37	46	158	52	54	3.5	3.5
22	2.5	3.5	......	......	13	40	40	164	50	19	3.5	4.5
23	2.5	3.5	......	......	10	40	43	158	49	15	8.5	4.5
24	2.5	5.0	......	......	7	37	46	151	47	13	5.5	5.5
25	2.5	3.5	......	......	5	43	43	128	44	12	4.5	7
26	2.5	3.5	......	......	3.5	43	46	109	40	12	3.5	8.5
27	4.5	5	......	......	7	46	43	88	42	12	2.5	4.5
28	2.5	7	......	......	7	43	49	94	40	12	2.5	4.5
29	2.5	7	......	......	......	40	59	98	40	10	3.5	4.5
30	2.5	5	7	......	......	40	62	94	38	10	3.5	5.5
31	2.5	......	7	......	......	40	......	128	......	10	3.5	......

Daily discharge, in second-feet, of Reese River near Berlin, Nev., for the years ending Sept. 30, 1914, 1915, 1916—Continued.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.									
1	5.5	7	7	28	69	118	35	17	....
2	5.5	7	7	28	62	128	35	17	....
3	5.5	7	8	28	62	128	35	16	....
4	5.5	7	8	30	62	128	36	16	....
5	5.5	7	8	31	65	118	36	14	....
6	5.5	7	7	32	69	101	35	14	....
7	5.5	7	7	34	71	86	35	14	....
8	5.5	7	7	34	71	69	34	....	....
9	5.5	7	7	34	73	69	31	....	....
10	5.5	7	7	34	69	69	27	....	1.7
11	5.5	....	7	34	73	67	25	....	1.5
12	5.5	....	7	34	73	67	21	....	2.3
13	4.5	....	7	37	69	67	21	....	2.3
14	3.5	....	11	40	73	62	20	....	2.3
15	5.5	....	11	42	73	62	20	....	2.5
16	5.5	....	12	43	78	60	20	....	2.7
17	5.5	....	12	59	80	59	19	....	2.7
18	5.5	....	13	57	73	58	19	....	2.3
19	5.5	....	12	65	73	56	19	....	2.3
20	7.0	....	12	65	69	54	21	....	2.7
21	7.0	....	12	62	65	52	22	....	2.7
22	5.0	....	13	62	62	51	22	....	2.5
23	5.0	....	13	62	65	50	21	....	2.7
24	6.0	....	13	65	69	48	21	....	2.7
25	7.0	....	13	65	78	47	20	....	3.1
26	7.0	....	13	62	78	47	19	....	3.1
27	7.0	....	13	65	78	47	19	....	3.1
28	9.0	....	25	62	78	40	18	....	3.1
29	7.0	....	25	69	88	37	17	....	3.1
30	7.0	....	28	65	101	36	17	....	3.1
31	7.0	....	30	....	105	....	17	....	....

Day.	Oct.	Nov.	Dec.	May.	June.	July.	Aug.	Sept.
1915–16.								
1	3.1	....	....	....	36	11.0	3.5	3.1
2	3.1	....	....	....	40	12	3.5	2.9
3	3.1	....	....	....	37	12	3.5	2.7
4	2.9	....	....	....	39	11	3.5	2.5
5	3.1	....	5.5	....	41	8.5	3.5	2.5
6	3.1	....	4.5	....	43	7.6	3.5	2.5
7	2.9	5.5	4.5	65	44	8.0	3.5	1.9
8	3.1	5.5	5.1	64	47	8.5	3.5	1.7
9	3.1	5.5	5.1	63	46	7.9	3.5	1.5
10	3.9	5.5	5.3	60	46	8.5	3.5	1.9
11	4.7	5.5	5.3	58	47	8.5	3.5	2.0
12	5.5	5.5	....	56	46	11	3.5	2.2
13	5.5	5.1	....	54	46	12	3.5	2.3
14	5.5	4.7	....	52	40	10	3.5	2.1
15	5.3	4.7	....	50	40	8.5	3.5	1.9
16	5.1	4.3	....	49	40	8.5	3.5	1.9
17	5.1	4.1	....	48	33	8.5	3.5	2.3
18	5.1	4.3	....	48	26	7.9	3.5	2.3
19	....	3.9	....	48	19	8.5	3.5	2.3
20	....	3.5	....	48	24	8.5	3.1	2.5
21	....	5.1	....	48	23	8.5	3.1	2.7
22	....	5.1	....	47	22	7.9	3.1	2.7
23	....	5.3	....	48	21	7.3	3.0	2.7
24	....	5.1	....	48	20	6.7	2.9	2.3
25	....	5.5	....	48	19	5.9	2.9	2.7
26	....	5.1	....	47	19	5.1	2.8	3.1
27	....	5.5	....	44	12	5.3	2.7	2.6
28	3.5	5.5	....	40	12	5.5	3.1	2.0
29	....	5.5	....	40	12	4.5	3.1	1.5
30	....	5.5	....	39	12	3.5	3.1	1.5
31	....	....	....	36	....	3.5	3.1	....

NOTE.—1914–15: Discharge interpolated Aug. 8-31, 10 second-feet; Sept. 1-9, 3.4 second-feet. 1915-16: Discharge interpolated Oct. 19-27, 4.3 second-feet; Oct. 29-31, 3.8 second-feet; Nov. 1-6, 4.9 second-feet; Dec. 1-4, 5.5 second-feet.

Monthly discharge of Reese River near Berlin, Nev., for the years ending Sept. 30, 1914, 1915, and 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1913-14.				
October	4.5	1	2.85	175
November	7	3.5	4.33	258
December	....	....	3.65	224
January	....	....	5.84	359
February	....	....	7.12	395
March	46	7	28.0	1,720
April	62	17	40.1	2,390
May	164	59	118	7,260
June	128	38	70.5	4,200
July	54	10	21.3	1,310
August	8.5	2.5	5.26	323
September	8.5	3.5	4.12	245
The year	164	1	26.1	18,900
1914-15.				
October	9.0	3.5	5.89	362
November 1-10	7.0	7.0	7.00	139
March	30	7.0	12.1	744
April	69	28	47.6	2,830
May	105	62	73.4	4,510
June	128	36	69.4	4,130
July	36	17	24.4	1,500
August	17	....	11.2	689
September	....	1.5	2.84	169
1915-16.				
October	5.5	2.9	4.09	251
November	5.5	3.5	5.01	298
December 1-11	5.5	4.5	5.21	114
May 7-31	65	36	49.9	2,220
June	47	12	31.7	1,890
July	12	3.5	8.08	497
August	3.5	2.7	3.31	204
September	3.1	1.5	2.29	136

BIG CREEK NEAR AUSTIN, NEV.

LOCATION.—In sec. 9, T. 17 N., R. 43 E., above headgate of W. S. Carter's ditch, half a mile above Carter ranch, and 14 miles southwest of Austin, Lander County.

DRAINAGE AREA.—About 9 square miles (measured on map issued by United States Forest Service).

RECORDS AVAILABLE.—October 12, 1913, to June 30, 1914; March 9 to September 30, 1916.

GAGE.—Vertical staff on left bank 5 feet above timber control; read by W. S. Carter. Original gage was a vertical staff nailed to willow tree on left bank 300 feet upstream, read October 12, 1913, to June 30, 1914.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of gravel. Control is timber flume, 6 feet long, 4 feet wide at bottom, with battered sides; point of zero flow at gage height, 0.0. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 0.71 foot July 4 (discharge, 9.8 second-feet); minimum stage recorded, 0.45 foot May 21 (discharge, 3.1 second-feet).

1914, 1916: Maximum stage recorded during period, 1.78 feet June 7, 1914 (discharge, 10.8 second-feet); minimum stage recorded May 21, 1916.

ICE.—No information.

DIVERSIONS.—Water diverted above station to irrigate a few acres of meadow.

REGULATION.—Flow at gage affected at times by irrigation diversions above.

ACCURACY.—Stage-discharge relation affected by filling in channel above artificial control. Rating curves not well defined because of lack of sufficient discharge measurements; one used March 9 to June 10 and the other June 26 to September 30. Gage read to hundredths once daily. Gage readings on days when water was diverted above not apt to be actual mean. Daily discharge ascertained by applying daily gage height to rating tables and by interpolating for short periods when gage was not read. For long periods of missing gage heights, daily discharge not determined. Records fair.

Discharge measurements of Big Creek near Austin, Nev., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 7[a]	L. W. Jordan	0.65	6.21
June 26	C. C. Jacob	.67	8.4
Aug. 27	L. W. Jordan	.40	3.0

[a] Stage of zero flow determined as zero on gage.

Daily discharge, in second-feet, of Big Creek near Austin, Nev., for the year ending Sept. 30, 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		4.0	4.5	5.3	8.8		3.3
2		4.3	5.1	5.3	9.1		3.3
3		4.3	5.1	5.5	9.1		3.3
4		4.2	5.3	5.7	9.8		3.3
5		4.2	5.3	5.9			3.4
6		4.2	5.5	6.1			3.4
7		4.3	6.4	6.6			3.5
8		4.2	5.9	6.6			3.5
9	4.0	4.2	5.9	6.6			3.6
10	4.0	4.2	6.1	6.8			3.6
11	4.0	4.3	5.3	7.4			3.6
12	4.0	4.3	3.7	7.5			3.9
13	4.0	4.3	4.5	7.6			3.9
14	4.0	4.2	4.7	7.6			3.9
15	4.0	4.2	4.5	7.7			3.9
16	4.0	4.2	4.3	7.8			3.9
17	4.0	4.2	4.5	7.9			3.9
18	4.0	4.3	4.5	7.9			3.9
19	4.0	4.2	4.0	8.0			3.9
20	4.0	4.2	3.7	8.1			3.9
21	4.0	4.2	3.1	8.2			3.9
22	4.0	4.3	4.3	8.2			4.2
23	4.0	4.3	4.5	8.3			3.9
24	4.0	4.3	4.5	8.4			3.6
25	4.0	4.5	4.5	8.5			3.6
26	4.2	4.5	4.7	8.5			3.6
27	4.2	4.7	5.5	7.0		3.3	3.6
28	4.2	5.0	4.8	8.2		3.3	3.6
29	4.0	5.1	5.0	8.5		3.3	3.6
30	4.0	5.0	5.1	8.5		3.4	3.6
31	4.0		5.1			3.6	

NOTE.—Discharge interpolated June 12–25 and Sept. 3–9. No gage height record July 5 to Aug. 26.

Monthly discharge of Big Creek near Austin, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 9-31	4.2	4.0	4.03	184
April	5.1	4.0	4.35	259
May	6.4	3.1	4.84	298
June	8.5	5.3	7.34	437
September	4.2	3.3	3.67	218

HUMBOLDT-LOVELOCKS IRRIGATION, LIGHT & POWER CO.'S FEEDER CANAL NEAR MILL CITY, NEV.

LOCATION.—In SW. ¼ sec. 29, T. 33 N., R. 35 E., a quarter of a mile below head of canal, and about 2 miles north of Mill City, Humboldt County.

RECORDS AVAILABLE.—February 19, 1914, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on left bank; inspected by Peter Organ.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—Earth section. Control indefinite; stage discharge relation is affected by growth of aquatic plants and by the wash from several small gullies below the station.

EXTREMES OF DISCHARGE.—1914–1916: Maximum stage, from water-stage recorder, 4.78 feet at 6 a. m. April 5, 1916 (discharge, 243 second-feet); canal dry October 1, 1915, to February 6, 1916, and June 13 to September 30, 1916.

ICE.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.—Flow regulated by head gates one-fourth mile above station.

ACCURACY.—Stage-discharge relation permanent; not affected by ice. Rating curve well defined between 0 and 250 second-feet. Operation of water-stage recorder satisfactory except for March 13-18 when daily staff gage readings were used, and June 9–12. Daily discharge ascertained by applying to rating table the mean daily gage heights determined by inspecting recorder graph except February 7, 29, March 11, 12, 18, 24, April 6, 9, 20, and May 18 for which it was determined by averaging the discharge values obtained by applying the rating table to hourly gage height, and June 9–12 when it was interpolated. Records good.

Canal diverts from Humboldt River in sec. 29, T. 33 N., R. 35 E., for storage in the Taylor-Pitt reservoirs near Humboldt. The water is returned to the river during the irrigation season, about 3 miles west of Humboldt through the Humboldt-Lovelocks Irrigation, Light & Power Co. outlet canal and carried in the natural channel to the headgates of the canals serving the Lovelocks district.

Discharge measurements of Humboldt-Lovelocks Irrigation, Light & Power Co.'s feeder canal near Mill City, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan].

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Mar. 11	4.37	206
19	.94	4.0
May 10	2.21	45.3

Daily discharge, in second-feet, of Humboldt-Lovelocks Irrigation, Light & Power Co.'s feeder canal near Mill City, Nev., for the year ending Sept. 30, 1916.

Day.	Feb.	Mar.	Apr.	May.	June.	Day.	Feb.	Mar.	Apr.	May.	June.
1		134	208	142	2.4	16	13	226	13	69	
2		160	173	134	2.4	17	52	226	12	68	
3		194	164	118	2.4	18	99	172	9.8	29	
4		204	212	110	2.4	19	114	5.2	7.8	4.2	
5		208	217	106	2.4	20	99	2.8	46	3.8	
6	0.0	212	120	96	2.4	21	106	1.7	118	3.4	
7	.3	217	61	92	2.0	22	114	1.3	122	3.0	
8	7.4	226	56	92	1.3	23	130	1.3	114	2.9	
9	9.6	226	36	85	1.0	24	134	40	110	2.5	
10	9.4	217	22	51	.8	25	134	110	110	2.5	
11	7.6	156	21	40	.5	26	130	155	114	2.5	
12	18	44	20	48	.2	27	130	199	122	2.5	
13	19	168	20	61	.0	28	130	226	102	2.5	
14	17	217	18	73		29	109	226	122	2.5	
15	13	226	15	70		30		226	138	2.5	
						31		226		2.5	

NOTE.—Canal dry Oct. 1 to Feb. 6 and June 13 to Sept. 30.

Monthly discharge of Humboldt-Lovelocks Irrigation, Light & Power Co.'s canal near Mill City, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October				0
November				0
December				0
January				0
February 6-29	134	0	66.7	3,180
March	226	1.3	157	9,650
April	217	7.8	87.4	5,200
May	142	2.5	49.1	3,020
June 1-13	2.4	0		40
July				0
August				0
September				0
The year				21,100

HUMBOLDT-LOVELOCKS IRRIGATION, LIGHT & POWER CO.'S OUTLET CANAL NEAR HUMBOLDT, NEV.

LOCATION.—In SE. ¼ sec. 30, T. 32 N., R. 33 E., at outlet of lower Taylor-Pitt reservoir, about 2½ miles west of Humboldt, Humboldt County.

RECORDS AVAILABLE.—February 15, 1914, to September 30, 1916.

GAGE.—Stevens continuous water-stage recorder on right bank about 100 feet above the weirs; inspected by Albert Olson.

DISCHARGE MEASUREMENTS.—Made from a footbridge one-fourth mile below gage or by wading.

CHANNEL AND CONTROL.—Two 8-foot Cippoletti weirs form a permanent control. There is no flow at 0 gage height.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 1.97 feet July 24 (discharge, 153 second-feet); canal dry October 1 to June 5, except for a few days in May, and August 29 to September 30.

1914–1916: Maximum stage recorded, 3.02 feet at noon April 30, 1915 (discharge, 296 second-feet).

ICE.—Gates usually closed during winter.

DIVERSIONS.—None.

Regulation.—Flow regulated by outlet gates a few hundred feet above station.

Accuracy.—Stage-discharge relation permanent; not affected by ice. Rating curve well defined between 0 and 150 second-feet. Operation of water-stage recorder satisfactory except during May when clock was not running. Daily discharge ascertained by applying to rating table the mean daily gage height taken from graph by inspection, except that for June 6, 13, 21, July 6, August 3, 10, 17, 18, and 28, it was determined by averaging the discharge obtained by applying hourly gage height to rating table. Discharge not determined for a few days in May when head gates were opened and clock was not running. Records good.

The following discharge measurement was made by L. W. Jordan:

June 12, 1916: Gage height, 0.97 foot; discharge, 51 second-feet.

Canal conducts stored water released from the Taylor-Pitt Reservoirs to the Humboldt River in the SW. ¼ sec. 31, T. 33 N., R. 33 E., for irrigation use in Lovelocks Valley several miles downstream.

Daily discharge, in second-feet, of Humboldt-Lovelocks Irrigation, Light & Power Co.'s outlet canal near Humboldt, Nev., for the year ending Sept. 30, 1916.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1	......	39	130	11	50	103	66	21	96	148	14
2	......	39	129	12	51	103	59	22	46	133	14
3	......	39	95	13	71	121	55	23	40	149	14
4	......	39	49	14	104	129	55	24	38	153	14
5	0	38	38	15	104	129	56	25	38	142	13
6	11	94	35	16	103	144	56	26	38	125	14
7	45	101	37	17	101	147	30	27	38	123	14
8	45	102	37	18	99	144	10	28	38	128	9.3
9	46	102	37	19	101	147	14	29	39	130	.0
10	50	102	65	20	107	148	14	30	39	130	......
								31	......	130	......

Note.—Head gate opened for a few days in May when recording gage was not running. Except for this period canal was dry Oct. 1 to June 5 and Aug. 29 to Sept. 30.

Monthly discharge of Humboldt-Lovelocks Irrigation, Light & Power Co.'s outlet canal near Humboldt, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
June 5-30	107	0	59.2	3,050
July	153	38	113	6,950
August 1-29	130	0	40.5	2,320
The period	....	....	....	12,300

PYRAMID AND WINNEMUCCA LAKES BASIN.

LAKE TAHOE AT TAHOE, CAL.

Location.—In SE. ¼ sec. 6, T. 15 N., R. 17 E., near outlet of lake at Tahoe, Placer County.

Drainage area.—519 square miles (including water surface of lake, which is 193 square miles).

Records available.—1900 to September 30, 1916.

Gage.—Vertical staff fastened to piling of boat landing near outlet; read by an employee of the United States Reclamation Service. Datum is 6,220 feet above sea level. Mean low-water elevation of lake is 6,226.0 feet.

Extremes of stage.—Maximum stage recorded during year, 9.80 feet July 14 to 18 and 20 to 24; minimum stage recorded, 6.96 feet December 1 and 2.

1900–1916: Maximum stage recorded, 11.26 feet July 14, 15, 17, and 18, 1907; minimum stage recorded, 4.68 feet December 19 to 21, 1913.

Accuracy.—Gage is read to hundredths once daily; not read when water surface is rough.

Cooperation.—Record furnished by United States Reclamation Service.

Daily gage height, in feet, of Lake Tahoe at Tahoe, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	7.80	7.35	6.96	7.00	8.05	8.11	8.12	8.58	9.17	9.68	9.68	9.24
2	7.79	7.34	6.96	7.02	8.05	8.18	8.12	8.60	9.18	9.69	9.67	9.22
3	7.76	7.34	6.97	......	......	8.16	8.12	8.62	9.19	9.70	9.66	9.19
4	7.75	7.32	7.09	7.32	8.10	8.14	8.12	8.64	9.21	9.71	9.65	9.17
5	7.74	7.31	7.09	......	8.08	8.15	8.13	8.68	9.24	9.72	9.64	9.15
6	7.73	7.28	7.10	7.27	......	8.14	8.14	8.74	9.28	9.74	9.63	9.14
7	7.73	7.25	7.10	7.30	8.05	8.14	8.15	8.77	9.30	9.74	9.60	9.12
8	7.72	7.21	7.10	......	......	8.13	8.17	8.79	9.32	9.75	9.58	9.09
9	7.70	7.32	7.80	......	8.06	8.12	8.19	8.81	9.35	9.76	9.55	9.06
10	7.68	7.27	7.80	......	8.08	8.10	8.20	8.83	9.38	9.76	9.53	9.04
11	7.66	7.24	7.80	7.32	8.08	8.09	8.22	8.84	9.40	9.77	9.52	9.02
12	7.64	7.22	7.40	......	8.08	8.08	8.21	8.86	9.43	9.78	9.52	9.00
13	7.60	7.20	7.12	7.50	8.08	8.06	8.25	8.88	9.45	9.79	9.50	9.00
14	7.59	7.19	7.22	......	8.08	8.05	8.27	8.89	9.48	9.80	9.48	8.99
15	7.58	7.17	7.22	7.61	8.08	8.04	8.28	8.91	9.50	9.80	9.47	8.98
16	7.56	7.15	7.21	......	8.08	8.03	8.28	8.92	9.53	9.80	9.46	8.97
17	7.55	7.13	7.19	7.68	8.08	8.02	8.29	8.94	9.56	9.80	9.44	8.96
18	7.53	7.10	7.19	......	8.06	8.01	8.30	8.96	9.57	9.80	9.42	8.94
19	7.52	7.10	7.18	7.73	8.05	8.02	8.33	8.98	9.58	9.79	9.39	8.92
20	7.51	7.09	7.18	7.72	8.06	8.06	8.35	9.01	9.59	9.80	9.37	8.90
21	7.49	......	7.15	......	8.07	8.07	8.37	9.02	9.60	9.80	9.34	8.88
22	7.48	......	7.13	7.78	8.07	8.07	8.39	9.04	9.62	9.80	9.32	8.95
23	7.45	7.03	7.12	7.78	8.06	8.08	8.40	9.06	9.63	9.80	9.31	8.93
24	7.44	......	7.11	......	8.05	8.09	8.42	9.07	9.65	9.80	9.30	8.91
25	7.43	7.00	7.10	7.82	8.05	8.10	8.44	9.09	9.67	9.79	9.29	8.89
26	7.41	7.02	7.08	7.82	8.07	8.10	8.46	9.11	9.67	9.78	9.29	8.86
27	7.40	7.01	7.08	7.87	8.08	8.10	8.48	9.13	9.67	9.76	9.28	8.83
28	7.40	7.00	7.05	......	8.08	8.10	8.51	9.14	9.67	9.74	9.27	8.82
29	7.39	6.99	7.03	8.03	8.09	8.11	8.53	9.15	9.68	9.73	9.27	8.81
30	7.38	......	7.01	8.05	......	8.12	8.56	9.15	9.68	9.71	9.26	8.80
31	7.37	......	......	8.05	......	8.10	......	9.16	......	9.70	9.25	......

Note.—Lake was too rough for accurate reading on days for which gage height is not recorded.

TRUCKEE RIVER AT TAHOE, CAL.

Location.—In NW. ¼ sec. 7, T. 15 N., R. 17 E., at Tahoe, Placer County, a short distance below dam at outlet of Lake Tahoe.

Drainage area.—519 square miles.

Records available.—July 3, 1895, to February 29, 1896; June 17, 1900, to September 30, 1916.

Gage.—Vertical staff fastened to a large cottonwood tree on left bank, 300 feet below dam at outlet of Lake Tahoe. Original gage was destroyed by dredging operation July 15, 1912.

Discharge measurements.—Made from cable 140 feet below gage or by wading.

Channel and control.—Gravel; practically permanent.

Extremes of discharge.—Maximum mean daily discharge for the year, 1,010 second-feet, March 5 and 6; minimum mean daily discharge, 12 second-feet, June 3–15.

1895–96 and 1900–1916: Maximum mean daily discharge reported, 1,340 second-feet, July 13 to 20, 1907 (stage, 4.3 feet); minimum, river dry during parts of 1900, 1901, and 1914.

Ice.—Stage-discharge relation affected slightly by ice.

DIVERSIONS.—No information.

REGULATION.—Flow regulated by operation of gates in dam at Lake Tahoe.

ACCURACY.—Stage-discharge relation not permanent. Two well-defined rating curves used, one applicable October 1, 1915, to July 24, 1916, the other July 25 to September 30, 1916. Gage read to hundredths at least once each day. Stage controlled by outlet gates at Lake Tahoe. Daily discharge ascertained by applying mean daily-gage height to rating tables.

COOPERATION.—Daily discharge and discharge measurement records furnished by United States Reclamation Service, which maintains the station in cooperation with Stone & Webster Engineering Corporation.

Discharge measurements of Truckee River at Tahoe, Cal., during the year ending Sept. 30, 1916.

[Made by R. E. Hartley].

	Gage Height.	Discharge.
July 27	3.47	521
Aug. 19	3.25	430
30	3.30	459

Daily discharge, in second-feet, of Truckee River at Tahoe, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	312	281	299	384	396	517	117	24	13	14	560	375
2	312	281	299	334	396	520	117	24	13	14	560	375
3	312	281	326	382	234	520	46	24	12	14	560	375
4	312	281	334	472	312	982	46	24	12	14	560	375
5	312	281	334	382	312	1,010	46	24	12	14	560	375
6	312	279	216	382	286	1,010	46	24	12	14	560	375
7	312	279	274	312	286	1,000	46	24	12	14	560	372
8	276	299	286	286	286	995	24	23	12	14	560	372
9	276	299	286	286	286	987	24	23	12	14	560	369
10	299	299	286	286	286	978	24	25	12	14	560	369
11	299	299	286	426	154	978	24	25	12	14	490	369
12	299	345	271	396	154	978	24	25	12	14	444	408
13	274	296	274	426	154	978	24	25	12	14	444	408
14	274	299	216	396	154	974	22	13	12	14	444	408
15	274	296	216	396	154	974	24	13	12	14	444	408
16	274	296	331	396	154	970	24	13	13	14	444	408
17	299	294	261	334	184	507	24	13	13	14	440	408
18	274	304	261	334	210	507	24	13	13	14	440	408
19	299	304	261	339	210	510	25	13	13	19	430	408
20	274	304	291	339	210	514	25	13	13	19	433	408
21	299	304	291	339	210	396	25	13	13	19	430	408
22	274	304	291	339	514	396	25	13	14	84	427	408
23	299	302	247	339	514	396	25	13	14	84	457	408
24	271	302	247	339	514	294	25	13	14	84	444	408
25	276	299	291	339	514	294	25	13	14	145	444	408
26	274	299	291	339	514	294	25	13	14	164	444	408
27	274	299	353	339	514	203	25	13	14	513	444	408
28	274	299	353	339	514	203	25	13	14	513	444	408
29	274	294	353	396	514	203	24	13	14	308	444	408
30	271	299	253	396	......	203	24	13	14	308	444	408
31	281	......	384	396	......	117	......	13	......	472	375	......

Monthly discharge of Truckee River at Tahoe, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	312	271	288	17,700
November	304	279	297	17,700
December	384	216	292	18,000
January	472	286	361	22,200
February	514	154	315	18,100
March	1,010	117	626	38,500
April	117	24	34.1	2,030
May	25	13	17.7	1,090
June	14	12	12.9	768
July	513	14	96.3	5,920
August	560	375	479	29,500
September	408	369	395	23,500
The year	1,010	12	269	195,000

NOTE.—Monthly discharge computed by United States Geological Survey.

TRUCKEE RIVER AT ICELAND, CAL.

LOCATION.—In sec. 36, T. 18 N., R. 17 E., above dam of ice company, 400 feet northeast of Southern Pacific Railroad station at Iceland, Nevada County, and about 23 miles west of Reno, Nev.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 1, 1912, to September 30, 1916.

GAGE.—Barrett & Lawrence water-stage recorder on right bank above dam; auxiliary vertical staff is fastened to gage well.

DISCHARGE MEASUREMENTS.—Made from cable 130 feet above gage.

CHANNEL AND CONTROL.—Small boulders; fairly smooth and permanent. Left bank high; right bank subject to overflow at high stages for 60 feet back from stream. Dam of National Ice Co. serves as permanent control.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge for the year, 4,370 second feet, April 11; minimum mean daily discharge, 358 second-feet, December 15. 1907–1916: Maximum mean daily discharge reported, 15,300 second-feet, March 18, 1907 (stage, 11.5 feet); minimum mean daily discharge reported, 310 second-feet, December 10, 1908 (stage, 7.9 feet).

ICE.—Stage-discharge probably somewhat affected by ice.

DIVERSIONS.—No information.

REGULATION.—See Truckee River at Tahoe.

ACCURACY.—Stage-discharge relation probably permanent. No information regarding rating curve for 1915–16. Mean daily gage height determined from water-stage recorder sheets. Daily discharge ascertained by applying mean daily gage height to rating table.

COOPERATION.—Daily discharge and discharge measurement records furnished by United States Reclamation Service, which maintains the station in cooperation with Stone & Webster Engineering Corporation.

Discharge measurements of Truckee River at Iceland, Cal., during the year ending Sept. 30, 1916.

[Made by R. E. Hartley.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 7	1.56	420	July 26	1.71	575
7	1.55	411	Aug. 3	2.01	778

Daily discharge, in second-feet, of Truckee River at Iceland, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	416	403	403	490	574	920	2,220	3,010	1,510	1,010	686	497
2	390	403	390	471	574	903	2,140	2,930	1,740	1,130	767	483
3	416	423	525	560	455	920	2,220	3,170	1,680	1,060	793	483
4	416	397	504	390	525	1,400	2,370	3,570	1,940	1,010	767	483
5	416	397	525	595	525	1,470	2,690	3,650	2,160	965	767	483
6	416	390	455	686	525	1,460	2,690	3,970	2,290	965	750	469
7	416	390	371	595	546	1,470	2,770	3,410	2,280	920	734	469
8	390	403	403	539	560	1,470	3,250	2,770	2,320	920	710	469
9	390	435	423	511	560	1,470	3,650	2,610	2,400	878	734	483
10	410	423	429	471	670	1,490	4,370	2,450	2,220	792	710	483
11	410	377	403	694	670	1,680	3,490	2,370	2,070	792	670	659
12	410	390	364	710	595	1,860	2,770	2,140	1,940	792	632	525
13	390	377	423	663	525	2,010	3,010	1,940	1,900	792	632	483
14	390	390	490	633	525	2,000	3,410	1,940	2,000	710	595	686
15	377	403	358	648	511	2,240	3,410	1,960	2,140	710	581	525
16	377	403	455	633	511	2,220	3,330	2,000	2,200	632	560	497
17	390	390	455	560	525	2,000	3,170	2,000	2,200	648	560	497
18	390	390	436	560	581	2,240	2,770	2,220	2,000	648	560	497
19	390	390	403	603	567	2,770	2,450	2,070	1,740	632	581	511
20	390	390	423	560	595	3,540	2,610	2,000	1,510	422	567	511
21	435	377	442	588	625	3,060	2,850	2,070	1,350	442	574	525
22	429	390	436	560	974	2,710	3,010	2,140	1,240	422	574	553
23	423	377	403	633	920	2,350	3,250	2,000	1,240	462	574	483
24	397	390	390	560	1,010	1,810	3,330	1,680	1,240	490	574	511
25	390	377	403	560	1,200	1,680	3,410	1,460	1,300	490	574	483
26	397	390	390	560	974	1,740	3,570	1,240	1,300	670	553	483
27	397	377	403	560	1,010	1,840	3,570	1,200	1,300	792	567	497
28	403	364	476	525	920	2,070	3,570	1,350	1,200	792	581	497
29	397	371	455	567	938	2,370	3,330	1,510	1,010	750	567	483
30	397	364	483	640	....	2,450	3,010	1,510	1,010	581	581	469
31	397	....	504	640	....	2,290	....	1,510	....	686	497	....

Monthly discharge of Truckee River at Iceland, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	435	377	402	24,700
November	435	364	391	23,300
December	525	358	433	26,600
January	710	390	580	35,700
February	1,200	455	679	39,100
March	3,540	903	1,930	119,000
April	4,370	2,140	3,060	182,000
May	3,970	1,200	2,250	138,000
June	2,400	1,010	1,750	104,000
July	1,130	422	742	45,600
August	793	497	631	38,800
September	686	469	506	30,100
The year	4,370	358	1,110	807,000

NOTE.—Monthly discharge computed by United States Geological Survey.

TRUCKEE RIVER AT RENO, NEV.

LOCATION.—In sec. 11, T. 19 N., R. 19 E., at Virginia Street Bridge in Reno, Washoe County, 6 miles above mouth of Steamboat Creek, and 12 miles below Nevada-California boundary.

DRAINAGE AREA.—1,070 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 1, 1906, to September 30, 1916.

GAGE.—Vertical staff fastened to retaining wall on left bank about 20 feet below the bridge; datum 4,481.60 feet above sea level. Read by employee of U. S. Weather Bureau.

Discharge measurements.—Made from the Rock Street Bridge 800 feet below gage or by wading.

Channel and control.—Bed composed of gravel and boulders; fairly permanent. One channel at all stages; river confined by retaining walls.

Extremes of discharge.—Maximum stage recorded during year, 5.3 feet April 11 (discharge, 5,020 second-feet); minimum stage, 0.6 foot October 1 (discharge, 88 second-feet).

1906–1916: Maximum stage recorded, 8.2 feet March 18, 1907 (discharge, 14,600 second-feet); minimum stage, −0.1 foot July 2 and 3, 1912 (discharge, 18 second-feet).

Ice.—Stage-discharge relation slightly affected by ice.

Diversion.—Numerous diversions for Truckee Valley above and below station.

Regulation.—Flow affected somewhat by the operation of several power plants above the station, by storage at Lake Tahoe, and by the irrigation diversions for Truckee Valley.

Accuracy.—Stage-discharge relation permanent; presumably affected by ice January 16 to February 3. Rating curve well defined between 20 and 4,000 second-feet. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage height to rating table except for period when stage-discharge relation was affected by ice. Records obtained by use of rating table good; others fair.

Discharge measurements of Truckee River at Reno, Nev., during the year ending Sept. 30, 1916.

[Made by L. W. Jordan.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 12	3.42	1,900	June 6	3.45	2,060
May 9	3.95	2,650	Aug. 5	1.22	255

Daily discharge, in second-feet, of Truckee River at Reno, Nev., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	88	182	368	368		880	2,190	2,730	1,310	660	324	213
2	107	182	368	368		880	2,320	3,030	1,310	805	417	182
3	107	182	368	660		880	2,320	3,030	1,220	730	471	182
4	154	182	660	417	471	1,410	2,320	3,520	1,720	660	417	182
5	107	213	368	471	530	1,510	2,730	3,870	1,830	660	368	182
6	129	213	368	530	471	1,410	2,730	4,440	2,070	660	368	182
7	129	182	324	471	530	1,410	3,030	3,520	2,070	660	324	182
8	129	247	368	471	660	1,410	3,030	2,880	2,070	660	284	129
9	107	284	368	530	595	1,510	3,520	2,730	2,190	660	324	154
10	107	324	324	530	1,040	1,610	3,870	2,450	2,070	530	324	154
11	107	284	368	530	1,040	1,830	5,020	2,320	1,950	530	324	182
12	107	247	324	471	730	1,950	3,190	2,190	1,720	530	284	284
13	129	284	324	471	595	2,320	2,450	1,950	1,720	530	182	247
14	107	284	417	595	595	2,320	2,730	1,830	1,720	471	247	182
15	107	324	324	530	595	2,190	3,190	1,830	1,830	417	284	182
16	107	284	284	530	595	2,450	3,030	1,830	2,070	417	247	182
17	107	284	368		595	2,190	3,190	1,830	2,070	368	213	182
18	129	324	324		595	2,320	2,450	1,950	1,830	324	247	213
19	129	324	284		595	2,590	2,190	2,070	1,610	247	247	213
20	154	324	284		595	3,870	2,190	1,830	1,510	213	213	182
21	154	368	368		660	3,520	2,450	2,070	1,220	213	247	182
22	213	368	368		960	2,880	2,590	2,070	1,040	182	129	213
23	182	368	368		960	2,590	2,730	1,950	1,040	182	247	247
24	247	324	324		960	1,950	3,030	1,720	1,040	182	247	247
25	213	368	284		960	1,720	3,030	1,310	1,130	182	247	182
26	213	368	324		960	1,610	3,350	1,040	1,040	182	213	213
27	182	368	324		960	1,830	3,520	960	960	182	213	213
28	182	284	368		960	1,950	3,690	1,040	1,040	417	213	247
29	154	368	368		960	2,320	3,190	1,220	1,040	417	247	213
30	182	368	368			2,450	2,880	1,220	730	324	247	247
31	182		368			2,190		1,310		324	247	

Note.—Daily discharge for period when stage-discharge relation was affected by ice, estimated as follows: Jan. 17–31, 470 second-feet, and Feb. 1–3, 420 second-feet.

Monthly discharge of Truckee River at Reno, Nev., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	247	88	144	8,850
November	368	182	290	17,300
December	660	284	355	21,800
January	660	368	490	30,100
February	1,040	....	704	40,500
March	3,870	880	2,000	123,000
April	5,020	2,190	2,940	175,000
May	4,440	960	2,190	135,000
June	2,190	730	1,540	91,600
July	805	182	436	26,800
August	471	129	278	17,100
September	284	129	200	11,900
The year	5,020	88	962	699,000

TRUCKEE RIVER AT CLARK, NEV.

Location.—In SE. ¼ sec. 26, T. 20 N., R. 22 E., at highway bridge about 600 feet from Southern Pacific Railroad station at Clark, Storey County.

Drainage area.—1,740 square miles.

Records available.—July 1, 1907, to June 6, 1910; [1]August 1, 1910, to December 31, 1915; when the station was discontinued.

Gage.—Vertical staff on south abutment of bridge.

Discharge measurements.—Made from highway bridge.

Channel and control.—Bed composed of rock and gravel; shifts occasionally.

Extremes of discharge.—Maximum mean daily discharge, October to December, 1,080 second-feet, December 4.

1907–1915: Maximum mean daily discharge, 7,760 second-feet,[2] January 1, 1914; minimum mean daily discharge, 65 second-feet August 9, 1913.

Ice.—No information.

Diversions.—Water is used for irrigation in Truckee Valley above the station.

Regulation.—Flow affected by the operation of several power plants above the station and also by manipulation of the outlet gates of Lake Tahoe.

Cooperation.—Records furnished by the United States Reclamation Service.

Daily discharge, in second-feet, of Truckee River at Clark, Nev., for the period October to December, 1915.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	300	420	630	11	320	500	960	21	340	440	440
2	320	440	930	12	340	520	440	22	320	460	460
3	300	440	990	13	340	520	460	23	340	480	420
4	320	460	1,080	14	360	500	480	24	340	480	460
5	340	460	1,050	15	340	500	500	25	360	500	400
6	340	440	1,020	16	320	520	500	26	340	500	340
7	360	440	990	17	320	480	540	27	340	480	360
8	340	460	990	18	340	500	520	28	360	460	320
9	340	480	930	19	360	500	460	29	380	480	320
10	340	500	960	20	360	460	480	30	360	500	280
								31	380	......	240

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[1] Just above Derby dam, where the discharge is practically the same as at Clark.

[2] Discharge at Reno, March 18, 1907, 14,600 second-feet.

Monthly discharge of Truckee River at Clark, Nev., for the period October to December, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	380	300	341	21,000
November	520	420	477	28,400
December	1,080	240	611	37,600
The period				87,000

NOTE.—Monthly discharge table compiled by United States Geological Survey.

HONEY LAKE BASIN.

GOLD RUN CREEK NEAR SUSANVILLE, CAL.

LOCATION.—In NE. ¼ sec. 17, T. 29 N., R. 12 E., at bridge on county road at Ridenour & Sons' ranch, about 2½ miles southeast of Susanville, Lassen County, Cal.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 24 to March 31, 1913, and March 21, 1915, to June 8, 1916 (not complete), when the station was discontinued.

GAGE.—Vertical staff nailed to upper side of right bridge abutment; read by S. D. Ridenour. Gage used in 1913 was at same location but different datum.

DISCHARGE MEASUREMENTS.—By wading or from bridge.

CHANNEL AND CONTROL.—Gravel and small boulders; subject to shift.

EXTREMES OF STAGE.—1913–1916: Water above gage May 11, 12, 1915, and February 10, 1916 (maximum discharge estimated 200 second-feet, Feb. 10, 1916); water below lower limit of gage (0.04 foot) most of October, all of November, and part of December, 1915 (discharge, less than 2.0 second-feet).

ICE.—Stage-discharge relation is affected by ice for short periods.

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Stage-discharge relation not permanent. Affected by ice December 30, 31, and January 3 to 6; also by back water due to operation of head gates of an irrigation ditch which heads between the gage and control. See footnote to daily-discharge table. Base rating curve fairly well defined. Gage read to hundredths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Gold Run Creek near Susanville, Cal., during the year ending Sept. 30, 1916.

[Made by Thad McKay.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 19	1.16	25
Mar. 26	1.16	26
May 17	[a] 1.26	22

[a] Stage-discharge relation probably affected by dam for irrigation.

Daily discharge, in second-feet, of Gold Run Creek near Susanville, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	....	....	6.5	11	22	31	30	26
2	....	....	6.4	11	20	28	36	27
3	....	....	6.5	11	19	26	46	30
4	....	....	6.5	11	20	27	58	35
5	....	....	40	11	22	28	64	43
6	....	....	10	17	19	28	75	42
7	....	....	9.4	78	18	29	42	42
8	....	....	9.8	38	18	32	42	38
9	....	....	9.8	38	25	37	37	....
10	....	....	9.2	200	35	44	30	....
11	....	....	8.6	86	42	71	27	....
12	....	....	8.4	44	58	40	27	....
13	....	....	8.0	34	85	35	26	....
14	....	....	7.9	30	39	32	24	....
15	....	....	8.2	30	37	40	24	....
16	....	....	7.9	32	42	36	23	....
17	5.4	6.8	8.2	32	47	40	24	....
18	....	6.9	8.4	32	52	33	36	....
19	....	6.7	8.5	28	114	28	28	....
20	....	6.8	14.0	31	99	26	25	....
21	....	6.8	16	29	65	27	28	....
22	....	6.9	30	29	50	27	36	....
23	....	7.8	24	28	42	27	40	....
24	5.4	7.3	48	29	34	31	40	....
25	5.5	7.2	28	28	29	34	35	....
26	5.4	6.7	17	40	26	47	34	....
27	....	6.7	16	37	29	44	32	....
28	....	6.8	14	30	31	52	31	....
29	....	6.6	12	25	32	42	31	....
30	....	6.6	12	....	29	32	30	....
31	....	6.5	11	....	26	....	28	....

NOTE.—Water below lower limit of gage (discharge, 2.0 second-feet) Oct. 1–16, 18–23, and Oct. 27 to Dec. 16. Stage discharge relation affected by ice Dec. 30, 31, and Jan. 3 to 6; discharge estimated. Feb. 10, water above top of gage morning and evening; discharge estimated. Apr. 25 to May 1, backwater due to irrigation, about 0.5 foot; May 2–18, backwater, about 0.24 foot; May 19–22, backwater, about 0.86 foot; and June 8, backwater, about 0.6 foot. The daily gage height was modified by these amounts for backwater, before applying to the base rating table for conditions of no backwater.

Monthly discharge of Gold Run Creek near Susanville, Cal., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
December 17–31	7.8	6.5	6.87	204
January	48	6.4	13.9	855
February	200	11	37.2	2,140
March	114	18	39.5	2,430
April	71	26	35.1	2,090
May	75	23	35.1	2,160
June 1–8	43	26	35.4	562
The period				10,400

LASSEN CREEK NEAR SUSANVILLE, CAL.

Location.—In NW. ¼ sec. 22, T. 29 N., R. 12 E., at Drake ranch, about 4½ miles southeast of Susanville, Lassen County.

Drainage area.—Not measured.

Records available.—March 13 to April 14, 1913, and March 21, 1915, to June 7, 1916 (not complete), when the station was discontinued.

Gage.—Staff gage on right bank; read by Jesse Drake, jr. Gage used in 1913 was a staff gage nailed to bent of highway bridge 1½ miles downstream at independent datum.

Discharge measurements.—Made by wading.

Channel and control.—Composed of firm clay; changes frequently. Both banks subject to overflow at high water.

Extremes of stage.—Maximum stage recorded during year, 3.74 feet at 3.10 p. m. February 11; minimum stage recorded, 0.78 foot May 12.

Ice.—Stage-discharge relation probably affected by ice.

Diversions.—Water is diverted above the station for irrigation.

Regulation.—No information.

Accuracy.—Stage-discharge relation changes frequently. Sufficient measurements were not obtained to define the changes. Gage read to hundredths twice daily.

Discharge measurements of Lassen Creek near Susanville, Cal., during the year ending Sept. 30, 1916.

[Made by Thad McKay.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 19	1.46	9.2
Mar. 26	1.46	8.7

Daily gage height, in feet, of Lassen Creek near Susanville, Cal., for the year ending Sept 30, 1916.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	....	0.87	1.07	1.32	1.73	1.16	0.98
2	....	.88	1.08	1.30	1.51	1.09	.97
3	....	.93	1.08	1.28	1.62	1.09	1.00
4	....	.97	1.15	1.31	1.50	1.17	1.00
5	....	.98	1.06	1.36	1.50	1.14	.99
6	....	1.02	1.19	1.26	1.51	1.37	.99
7	....	1.04	1.47	1.31	1.50	1.26	1.04
8	....	1.20	1.55	1.23	1.52	1.07	....
9	....	1.08	1.62	1.36	1.52	.94	....
10	....	1.09	1.68	1.37	1.63	.89	....
11	....	1.04	3.72	1.57	2.14	.85	....
12	....	.98	2.04	1.54	1.69	.78	....
13	....	.99	1.43	1.58	1.65	.82	....
14	....	.99	1.38	1.57	1.55	.85	....
15	....	1.18	1.29	1.48	1.63	.81	....
16	....	1.11	1.45	1.60	1.60	.92	....
17	1.07	1.04	1.44	1.56	1.89	.97	....
18	1.05	1.11	1.46	1.82	1.62	1.09	....
19	1.07	1.08	1.41	2.34	1.54	1.14	....
20	1.06	1.03	1.51	2.34	1.46	1.12	....
21	1.05	1.02	1.51	1.93	1.52	1.05	....
22	1.07	1.07	1.45	1.53	1.46	1.04	....
23	1.07	1.52	1.46	1.70	1.42	1.09	....
24	1.06	2.02	1.53	1.58	1.40	1.05	....
25	1.06	1.70	1.54	1.51	1.38	1.05	....
26	.99	1.52	1.80	1.51	1.25	.99	....
27	.99	1.37	2.20	1.74	1.31	1.05	....
28	1.06	1.32	1.58	1.75	1.26	1.01	....
29	.94	1.36	1.40	1.60	1.22	1.00	....
30	.91	1.20	....	1.53	1.16	.96	....
31	.85	1.11	....	1.47	....	.96	....

BAXTER CREEK NEAR JANESVILLE, CAL.

Location.—In NE. ¼ SW. ¼ sec. 32, T. 29 N., R. 13 E., 200 feet west of bridge on county road at ranch of D. J. Sweeney, and 2½ miles northwest of Janesville, Lassen County.

Drainage area.—Not measured.

Records available.—February 17, 1913, to July 31, 1916, when the station was discontinued.

Gage.—Inclined staff on left bank, installed March 21, 1915; read by D. J. Sweeny. Original gage was 400 feet above; original datum not maintained.

Discharge measurements.—Made from footbridge or by wading.

Channel and control.—Composed of gravel, small boulders and sand; somewhat shifting. An artificial control, effective at low stages, was constructed March 21, 1915, but its effect was destroyed by the changes produced by the flood of February 10, 1916. Zero flow was at stage 1.3 feet.

Extremes of stage.—Maximum stage recorded during year, 8.85 feet at 5 p. m. February 10; minimum stage recorded, 1.3 feet October 1 to November 3 (practically no flow).

1913-1916: Maximum stage recorded, 9.6 feet at 5 p. m. January 25, 1914 (discharge, 360 second-feet); minimum stage recorded, 1.3 feet (gage installed March 21, 1915) July 25 to November 3, 1915 (practically no flow).

Ice.—Stage-discharge relation affected by ice for short periods.

Diversions.—Small amount of meadow land irrigated above station.

Regulation.—No information.

Accuracy.—Stage-discharge relation changed frequently after January 5; observer's notes and record of stage indicate ice effect from about January 6 to 25 and from February 3 to 9. Rating curve, November 2 to January 5, fairly well defined. Gage read to half-tenths twice daily. Daily discharge ascertained by applying mean daily gage height to rating table. Records fair up to January 5. Sufficient measurements were not obtained to define the changes in stage-discharge relation after January 5.

Discharge measurements of Baxter Creek near Janesville, Cal., during the year ending Sept. 30, 1916.

[Made by Thad McKay.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Feb. 6	3.40	20	Apr. 24	3.18	18
Mar. 26	2.70	14	May 17	2.91	23
Apr. 17	3.68	41			

Daily gage height, in feet, of Baxter Creek near Janesville, Cal., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	1.3	1.3	1.50	1.55	2.90	2.80	2.95	3.35	2.95	1.90
2	1.3	1.3	1.65	1.55	2.70	2.75	2.95	3.45	3.05	1.90
3	1.3	1.3	1.85	1.85	2.95	3.00	2.95	3.75	3.10	1.85
4	1.3	1.35	1.75	1.90	2.90	3.05	2.85	3.80	2.95	1.85
5	1.3	1.5	1.65	1.95	2.85	3.50	2.80	3.75	2.95	1.85
6	1.3	1.5	1.65	2.50	3.42	2.90	2.82	3.90	2.95	1.85
7	1.3	1.5	1.60	2.60	4.60	2.75	2.80	3.55	2.95	1.75
8	1.3	1.5	1.58	2.60	4.25	3.00	2.90	3.50	2.95	1.75
9	1.3	1.55	1.60	2.60	4.25	3.05	3.05	3.45	2.85	1.75
10	1.3	1.45	1.55	2.60	8.80	3.10	3.35	3.40	2.72	1.75
11	1.3	1.4	1.62	2.55	5.25	3.30	3.55	3.35	2.70	1.75
12	1.3	1.4	1.75	2.40	4.15	3.40	3.30	3.25	2.68	1.75
13	1.3	1.4	2.85	2.25	3.38	3.30	3.10	3.10	2.55	1.75
14	1.3	1.4	2.20	2.20	3.25	2.90	3.22	3.10	2.52	1.75
15	1.3	1.45	1.88	2.15	3.35	2.88	3.28	3.10	2.48	1.75
16	1.3	1.5	1.65	2.10	3.30	3.00	3.28	3.15	2.42	1.65
17	1.3	1.5	1.60	2.00	2.75	3.20	3.52	2.95	2.35	1.65
18	1.3	1.5	1.60	2.30	2.80	3.30	3.25	3.25	2.30	1.65
19	1.3	1.5	1.60	2.65	2.90	3.80	3.15	3.08	2.28	1.65
20	1.3	1.5	1.60	2.70	3.05	3.80	3.05	3.05	2.20	1.65
21	1.3	1.5	1.60	2.70	3.10	3.50	3.15	3.25	2.15	1.65
22	1.3	1.5	1.65	2.75	2.95	3.40	3.20	3.20	2.05	1.65
23	1.3	1.55	1.68	3.45	2.85	3.25	3.20	3.28	2.05	1.65
24	1.3	1.6	1.65	3.60	2.75	2.95	3.20	3.25	2.05	1.65
25	1.3	1.65	1.70	4.48	2.85	2.85	3.25	3.05	1.95	1.55
26	1.3	1.65	1.62	4.30	3.35	2.85	3.45	2.95	1.85	1.55
27	1.3	1.6	1.58	4.10	3.45	2.85	3.40	2.95	1.85	1.50
28	1.3	1.6	1.55	3.65	3.10	3.00	3.45	2.95	1.85	1.45
29	1.3	1.5	1.55	3.45	2.80	2.90	3.35	2.95	1.82	1.45
30	1.3	1.5	1.55	3.15	....	2.85	3.30	2.95	1.88	1.45
31	1.3	....	1.55	3.00	....	2.75	....	3.00	....	1.45

Daily discharge, in second-feet, of Baxter Creek near Janesville, Cal., for the period Oct. 1, 1915, to Jan. 5, 1916.

Day.	Nov.	Dec.	Jan.	Day.	Nov.	Dec.	Jan.	Day.	Nov.	Dec.	Jan.
1	......	1.0	1.4	11	0.4	1.9	......	21	1.0	1.7	......
2	......	2.2	1.4	12	.4	3.3	......	22	1.0	2.2	......
3	......	4.6	4.6	13	.4	24	......	23	1.4	2.5	......
4	0.2	3.3	5.3	14	.4	11	......	24	1.7	2.2	......
5	1.0	2.2	6.2	15	.7	5.0	......	25	2.2	2.7	......
6	1.0	2.2	......	16	1.0	2.2	......	26	2.2	1.9	......
7	1.0	1.7	......	17	1.0	1.7	......	27	1.7	1.6	......
8	1.0	1.6	......	18	1.0	1.7	......	28	1.7	1.4	......
9	1.4	1.7	......	19	1.0	1.7	......	29	1.0	1.4	......
10	.7	1.4	......	20	1.0	1.7	......	30	1.0	1.4	......
								31	......	1.4	......

NOTE.—No flow Oct. 1 to Nov. 3.

WARNER LAKES BASIN.

TWENTYMILE CREEK NEAR WARNER LAKE, OREG.

LOCATION.—In sec. 24, T. 40 S., R. 23 E., about a quarter of a mile above highway bridge at mouth of canyon, 2 miles south of Warner Lake post office, Lake County; below all tributaries.

DRAINAGE AREA.—155 square miles[1] (measured on U. S. Reclamation Service map). The total drainage area is 213 square miles, but an area of 58 square miles tributary to Cowhead Lake contributed no water to Twentymile Creek from about June 1, 1911, until the spring of 1914, none in 1915, and probably very little in 1914 or 1916.

RECORDS AVAILABLE.—March 1, 1910, to July 2, 1916, when station was discontinued.

GAGE.—Stevens continuous water-stage recorder on right bank beginning October 8, 1915; Barrett & Lawrence recorder, December 3, 1914, to October 8, 1915; gage reader, F. B. Houston. Original gage at bridge, March 1 to June 3, 1910; staff gage at site of present recorder, read June 3, 1910, to December 3, 1914, except March 31 to July 20, 1914, when a Barrett & Lawrence recorder, temporarily installed, was used. Gage readings during 1910 and 1911 refer to datum 0.32 foot higher than that used from 1912 to date.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Stream bed of boulders and gravel. Control is solid rock reef, broken by crevices, obstructions piled on this occasionally change discharge relation. A diversion dam installed about July 1 each year below highway bridge sometimes causes a slight backwater effect at gage. Banks not subject to overflow. Stage of zero flow, −0.2 foot ±.02.

EXTREMES OF DISCHARGE.—Maximum stage during year (estimated by observer from high-water marks), 6.4 feet March 14 or 15 (discharge, 1,130 second-feet); minimum stage recorded during year, 0.36 foot September 24 (discharge, 2.6 second-feet); this was probably very close to actual minimum.

1910–1916: Maximum stage recorded, 4.8 feet at original gage at bridge, March 1, 1910 (discharge, 2,610 second-feet). The peak may have been even higher. Minimum stage recorded, 0.26 foot August 30 and September 1, 1915 (discharge 1.8 second-feet).

ICE.—Ice forms in the stream but seldom at the control; stage-discharge relation not seriously affected; open-channel rating curve assumed applicable most of winter.

DIVERSIONS.—Some bottom land is irrigated along Fifteenmile and Twelvemile Creeks, and along Eightmile Creek, a tributary of Cowhead Lake. Two small ditches divert just above the station. There is also a ditch that diverts from the head of Twelvemile Creek into Lake Anne, a small storage reservoir in the north end of Surprise Valley.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined by measurements of 1915. Operation of water-stage recorder satisfactory from about February 5 to July 2, except during high water of March 13 to 25, when pencil did not reverse properly. Recorder in operation only part of time, October to January. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting gage-height graph or for days of large fluctuation, by averaging discharge obtained from gage heights for fractions of day. Records good, except for March, for which they are fair.

The following discharge measurement was made by Henshaw and Batchelder:
October 6, 1915: Gage height, 0.47 foot; discharge, 3.8 second-feet.

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[1] Revised since publication of Water-Supply Paper 390.

Daily discharge, in second-feet, of Twentymile Creek near Warner Lake, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Sept.
1	3.5	4.7	5.8	4.0	*a* 7.0	27	156	102	67	31	......
2	*a* 3.5	5.0	7.7	*a* 4.2	*a* 8.0	26	109	101	67	31	......
3	*a* 3.6	5.2	8.9	*a* 4.5	*a* 8.0	22	91	98	70	......	......
4	*a* 3.6	5.6	12	*a* 4.7	*a* 9.0	22	90	115	84	......	......
5	*a* 3.7	*a* 5.6	8.4	*a* 5.0	*a* 10	25	72	123	101	......	......
6	3.7	*a* 5.7	7.4	*a* 5.2	12	21	63	126	95	......	......
7	*a* 3.7	*a* 5.7	7.1	*a* 5.5	16	23	65	106	92	......	......
8	*a* 3.6	*a* 5.8	6.4	5.7	18	77	69	94	91	......	......
9	3.6	5.8	6.1	*a* 5.8	18	264	77	84	97	......	......
10	*a* 3.6	*a* 5.7	*a* 6.2	*a* 5.9	70	366	87	76	90	......	......
11	*a* 3.6	*a* 5.6	6.4	*a* 6.0	116	370	134	68	76	......	......
12	*a* 3.5	*a* 5.5	6.5	*a* 6.2	98	525	84	62	71	......	......
13	*a* 3.5	*a* 5.4	*a* 6.6	*a* 6.3	82	675	63	*a* 63	68	......	......
14	3.5	*a* 5.3	*a* 6.7	*a* 6.4	79	760	63	*a* 64	66	......	......
15	3.7	5.2	*a* 6.9	6.5	98	760	72	*a* 65	67	......	......
16	4.0	6.8	*a* 7.0	*a* 6.5	116	385	*a* 71	*a* 66	70	......	......
17	4.0	5.7	*a* 7.1	*a* 6.6	130	410	*a* 70	*a* 67	69	......	......
18	4.0	6.5	7.2	*a* 6.6	112	510	*a* 69	*a* 68	70	......	......
19	3.9	6.2	*a* 7.2	*a* 6.7	98	615	*a* 68	*a* 69	67	......	......
20	3.8	6.0	*a* 7.3	*a* 6.7	97	*a* 530	*a* 67	70	60	......	......
21	4.0	6.4	*a* 7.4	*a* 6.8	112	*a* 450	*a* 66	76	52	......	......
22	4.0	6.2	*a* 7.5	6.8	116	*a* 370	*a* 65	73	44	......	......
23	4.2	6.0	*a* 7.6	11	88	*a* 290	*a* 64	73	39	......	......
24	4.6	6.1	*a* 7.7	13	83	*a* 210	63	76	36	......	2.6
25	4.6	7.1	7.7	13	80	126	73	73	35	......	......
26	*a* 4.6	10	*a* 7.2	*a* 11	108	156	82	109	34	......	......
27	*a* 4.6	6.8	*a* 6.6	*a* 9.0	123	230	95	87	34	......	......
28	*a* 4.6	*a* 6.6	*a* 6.1	*a* 7.0	56	270	97	71	32	......	......
29	*a* 4.7	*a* 6.3	*a* 5.6	6.0	36	137	87	73	32	......	......
30	*a* 4.7	*a* 6.1	*a* 5.1	*a* 6.0	......	94	91	69	31	......	......
31	*a* 4.7	......	*a* 4.5	*a* 7.0	......	98	......	70	......	......	......

a Discharge interpolated.

NOTE.—Daily discharge Mar. 13–24 estimated from imperfect gage-height graph and high watermark and is very uncertain. Discharge Jan. 29 estimated; stage-discharge relation slightly affected by ice.

Monthly discharge of Twentymile Creek near Warner Lake, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	4.7	3.5	3.96	243
November	10	4.7	6.02	358
December	12	4.5	7.03	432
January	13	4.0	6.83	420
February	130	7.0	69.1	3,970
March	760	21	286	17,600
April	156	63	80.8	4,810
May	126	62	81.8	5,030
June	101	31	63.6	3,780
The period	....	....	....	36,600

DEEP CREEK AT ADEL, OREG.

LOCATION.—In SE. ¼ sec. 21, T. 29 S., R. 24 E., just back of Wible's Hotel at Adel, Lake County, about one-eighth mile upstream from wagon bridge crossing creek; below all tributaries.

DRAINAGE AREA.—250 square miles (measured on United States Reclamation Service map).

RECORDS AVAILABLE.—May 11, 1909, to May 31, 1916, when station was discontinued.

GAGE.—Barrett & Lawrence water-stage recorder, June 20 to September 30, 1914; March 19 to May 27, 1915; and March 7 to May 31, 1916. Friez recorder, March 10 to June 19, 1914; daily readings on vertical staff on left bank at other times; datum unchanged since 1913. Gage reader, W. S. Wible.

DISCHARGE MEASUREMENTS.—Made from the wagon bridge or by wading.

CHANNEL AND CONTROL.—Probably permanent except for slight shifts affecting only low water; bed of stream composed of gravel and boulders; banks subject to overflow at both gage and bridge in extreme floods. Stage of zero flow, 2.0±.1 feet.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 5.7 feet at 3 a. m. March 12 and 5 a. m. March 19 (discharge, 1,180 second-feet); minimum stage recorded during year, 2.4 feet January 1 to 19 (very uncertain discharge estimated about 5 second-feet).

1909–1915: Maximum stage recorded, 9.0 feet at 6 p. m. March 2, 1910 (discharge, 4,950 second-feet); minimum stage recorded, 2.35 feet August 19 to 21 1915 (discharge, 2.0 second-feet).

ICE.—Stage-discharge relation probably not affected by ice.

DIVERSIONS.—Considerable area irrigated from tributaries and 2,000 or 3,000 acres watered by natural flooding in Big Valley and Crane Lake. Five ditches, with a total capacity of about 30 second-feet, divert water within 2 miles above the gage and carry some 5,000 acre-feet around the gage each year.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read once a day to half-tenths October 14 to January 28. Operation of water-stage recorder fairly satisfactory during period March to May except March 10, 11, and 24, when float was stuck, but record is subject to slight error, as staff gage was read only to nearest tenth. Daily discharge ascertained by applying to rating table the daily gage reading or the mean daily gage height obtained by inspecting the gage-height graph. Records fair October to January; good March to May. For February, poor.

The following discharge measurement was made by Henshaw and Batchelder:
October 6, 1915: Gage-height, 2.61 feet; discharge, 6.6 second-feet.

Daily discharge, in second-feet, of Deep Creek at Adel, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Mar.	Apr.	May.
1	....	11	16	....	....	417	397
2	....	11	20	....	....	337	417
3	....	11	18	....	....	337	461
4	....	11	16	....	....	357	505
5	....	11	16	....	....	319	552
6	7	11	16	....	....	301	528
7	....	11	16	....	69	319	505
8	....	11	16	....	87	357	439
9	....	11	16	....	191	417	417
10	....	11	16	....	400	483	357
11	....	11	16	....	610	675	301
12	....	11	16	....	820	483	265
13	....	11	16	....	528	397	265
14	11	11	16	....	528	417	233
15	11	16	16	....	790	461	233
16	11	24	30	....	850	417	219
17	11	24	60	....	760	439	233
18	11	24	44	....	850	417	319
19	11	20	36	....	1,020	337	337
20	11	16	36	....	625	319	265
21	11	16	36	11	528	319	265
22	11	20	30	11	397	377	249
23	11	30	51	14	249	397	283
24	11	60	60	11	313	439	301
25	11	36	51	11	377	483	337
26	11	36	24	11	439	505	377
27	11	30	20	11	675	528	397
28	11	16	7	14	439	461	337
29	11	16	7	12	337	417	319
30	11	16	7	12	301	397	265
31	11	....	6	12	357	....	265

NOTE.—Mean discharge estimated as follows: Oct. 1–5, 6 second-feet; Oct. 7–13, 9 second-feet; Jan. 1–20, 5 second-feet; Jan. 29–31, 12 second-feet; Mar. 1–6, 40 second-feet. Daily discharge interpolated Mar. 10, 11, and 24.

Monthly discharge of Deep Creek at Adel, Oreg.; for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	11		9.6	590
November	60	11	18.5	1,100
December	60	6	24.2	1,490
January	14		7.4	455
February			[a] 80	4,600
March	1,020		412	25,300
April	675	301	411	24,500
May	552	219	343	21,100
The period				79,100

[a] Estimated from comparison with Twentymile Creek.

ABERT LAKE BASIN.

CHEWAUCAN RIVER AT DAM SITE NEAR PAISLEY, OREG.

Location.—In NW. ¼ sec. 10, T. 36 S., R. 18 E., a quarter of a mile below site of proposed reservoir dam of Paisley project of Northwest Townsite Co., half a mile below Little Swamp Creek, a mile below South Creek, and about 20 miles south of Paisley, Lake County.

Drainage area.—158 square miles (measured on map of Fremont National Forest).

Records available.—June 25, 1912, to September 2, 1914 (fragmentary); September 3, 1914, to October 31, 1916. when station was discontinued.

Gage.—Stevens 8-day water-stage recorder installed May 26, 1915. Vertical staff on right bank used previously. Gage reader, F. M. Beane.

Discharge measurements.—Made from cable 20 feet below gage or by wading.

Channel and control.—Gravel and boulders; fairly permanent.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 3.36 feet at 2 a. m. May 5, and 3 a. m. May 6 (discharge, 594 second-feet); minimum stage, from water-stage recorder, 0.54 foot at 5 a. m. December 10 (discharge, 8 second-feet; low stage caused by freezing of the river above, which temporarily held back the water.)

Ice.—Stage-discharge relation seriously affected by ice.

Diversions.—None.

Regulation.—No artificial regulation; considerable diurnal fluctuation during spring flood and first few days of freezing weather in the fall.

Accuracy.—Stage-discharge relation practically permanent; slight shift affecting only low water occurred during high water. Two well-defined rating curves used which are identical above gage-height 1.5 feet. Operation of water-stage recorder satisfactory except during winter. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting the recorder graph; records for ice period based mostly on meter measurements. Records excellent except for period when stream was affected by ice, for which they are fair.

Cooperation.—Field data furnished by Northwest Townsite Co.

Discharge measurements of Chewaucan River at dam site near Paisley, Oreg., during the period October, 1915, to November, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Dec. 15	Daniels and Beane	1.04	24.9	Mar. 9	F. M. Beane	1.39	72
23	F. M. Beane	1.23	55	13	W. S. Daniels	2.15	203
				18	F. M. Beane	2.42	258
1916.				26	.....do	1.87	151
Jan. 15	.....do	1.51	31.2	Apr. 5	Daniels and Beane	2.10	189
29	.....do	1.59	37.6	9	F. M. Beane	2.42	261
Feb. 8	.....do	1.72	42.4	May 4	W. S. Daniels	3.07	480
15	.....do	1.49	57	June 24	.....do	1.95	160
22	.....do	1.50	86	Oct. 10	.....do	1.00	31.3
Mar. 1	.....do	1.30	64	Nov. 10	.....do	1.31	63

Daily discharge, in second-feet, of Chewaucan River at dam site near Paisley, Oreg., for the period Oct. 1, 1915, to Oct. 31, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	25	28	43	......	62	200	398	260	152	40	31	......
2	25	28	47	......	*a* 60	190	415	248	142	40	31	......
3	26	30	58	......	*a* 60	190	450	260	127	40	31	......
4	26	30	55	......	59	200	530	290	118	39	31	......
5	26	29	45	......	60	190	550	320	109	39	33	......
6	26	23	52	......	*a* 64	200	570	335	103	39	34	......
7	26	24	50	......	*a* 68	222	490	335	99	39	32	......
8	26	29	46	42	71	248	450	335	93	38	31	......
9	26	27	41	......	75	275	432	350	89	38	31	......
10	26	28	28	......	104	320	*a* 376	350	86	39	31	31
11	26	36	......	......	92	335	320	320	81	38	31	31
12	26	24	......	......	138	290	311	305	77	40	31	31
13	26	......	......	......	186	275	293	260	76	39	31	31
14	26	......	......	......	154	305	275	260	72	39	31	31
15	26	......	25	57	180	320	275	248	71	38	30	30
16	25	......	......	*a* 67	210	350	290	260	68	38	30	30
17	25	......	......	77	222	320	305	260	81	43	30	30
18	26	......	......	74	255	290	350	248	76	*a* 41	30	30
19	26	45	......	......	305	248	335	222	68	*a* 39	30	30
20	26	42	......	......	335	235	320	222	62	*a* 38	30	30
21	26	50	......	......	275	248	......	210	59	37	30	31
22	26	......	......	86	235	275	......	190	56	37	30	30
23	29	......	53	......	200	275	......	170	54	36	30	28
24	32	......	51	......	190	*a* 312	......	160	53	34	30	30
25	29	......	54	......	166	350	......	154	51	34	......	31
26	29	......	......	......	160	415	......	154	51	33	......	31
27	29	43	......	......	200	450	290	156	50	33	......	30
28	28	48	......	......	190	432	275	146	49	32	......	28
29	28	49	......	64	168	380	260	140	45	31	......	28
30	28	42	......	......	160	380	260	154	42	31	......	32
31	28	......	......	......	168	......	275	......	41	31	......	31

a Interpolated.

NOTE.—Stage-discharge relation affected by ice Nov. 13–16, Dec. 11–19, and Dec 26, to Feb. 16; daily discharge for these periods estimated only for days for which record is available, from observer's notes and records of temperature. Mean discharge estimated as follows: Nov. 13–18, 30 second-feet; Nov. 22–26, 40 second-feet; Dec. 11–14, 25 second-feet; Dec. 16–22, 45 second-feet; Dec. 26, to Feb. 7, 30 second-feet; Feb. 9–14, 50 second-feet; Feb. 19–21 and 23–28, 80 second-feet; May 21-26, 305 second-feet; Sept. 25-30, 30 second-feet; Oct. 1-9, 31 second-feet. Daily discharge interpolated Mar. 2, 3, 6, 7, Apr. 24, May 10, and Aug. 18–20.

Monthly discharge of Chewaucan River at dam site near Paisley, Oreg., for the period Oct. 1, 1915, to Oct. 31, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	32	25	26.7	1,640
November	50	23	34.5	2,050
December	58	25	40.1	2,470
January			[a] 30.0	1,840
February			58.5	3,360
March	335	59	157	9,650
April	450	190	291	17,300
May	570	260	352	21,600
June	350	140	244	14,500
July	152	41	77.5	4,770
August	43	31	37.2	2,290
September	34	30	30.7	1,830
The year	570		115	83,300
October	32	28	30.5	1,880

[a] Estimated.

CHEWAUCAN RIVER NEAR PAISLEY, OREG.

LOCATION.—In SW. ¼ sec. 27, T. 33 S., R. 18 E., just above mouth of Mill Creek, half a mile above intake of Conn ditch and about 2½ miles upstream from Paisley, Lake County.

DRAINAGE AREA.—263 square miles (measured on map of Fremont National Forest).

RECORDS AVAILABLE.—January 20, 1914, to September 30, 1916. Records giving practically the same yearly run-off are available, as follows: Chewaucan River above Mill Creek, near Paisley, Oreg. (Geological Survey gage), November 6, 1912, to September 30, 1914; Chewaucan River above Conn ditch, near Paisley, Oreg., April 3 to July 13, 1912; Chewaucan River at Paisley, Oreg., January 4, 1905, to December 31, 1907, and January 18, 1909, to April 15, 1912.

GAGE.—Lietz water-stage recorder, belonging to Chewacan Land & Cattle Co., on left bank, known as ZX gage, about 50 feet above Geological Survey gage; inspected by A. A. Farrow. Stevens 8-day water-stage recorder, belonging to Northwest Townsite Co., on left bank, May 1 to September 30, 1916, referred to vertical staff known as Geological Survey gage; inspected by W. S. Daniels. Both gages are referred to same datum, but slope of water surface causes a slight difference in comparative readings.

DISCHARGE MEASUREMENTS.—Made by wading or from cable between the two recorders; fairly good section.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. Control the same for both gages; just above Mill Creek; composed of boulders and shifts slightly during floods.

EXTREMES OF DISCHARGE.—Maximum stage during year from ZX water-stage recorder, 3.15 feet May 5 (discharge, 730 second-feet); minimum stage from ZX water-stage recorder, 0.45 foot November 7 (discharge, 10 second-feet).

1905–1907 and 1909–1916: Maximum stage recorded on old gage one-half mile above Paisley, 9.40 feet at 5 p. m. November 23, 1909 (discharge estimated from extension of rating curve, 4,000 second-feet); minimum discharge is that of 1916.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—Not over two or three hundred acres are irrigated above the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent; rating curves for both gages revised slightly on basis of measurements made in 1916 and are well defined. Operation of both recorders satisfactory except the ZX gage for period March 22 to 30. Daily discharge ascertained by applying to rating table the mean daily gage height obtained by inspecting recorder graph. Records excellent except for periods when stream was frozen, for which they are fair.

COOPERATION.—Field data furnished by Chewacan Land & Cattle Co. and Northwest Townsite Co.

Discharge measurements of Chewaucan River near Paisley, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	U. S. G. S. gage height.	ZX gage height.	Discharge.	Date	Made by—	U. S. G. S. gage height.	ZX gage height.	Discharge.
		Feet.	*Feet.*	*Sec.-ft.*			*Feet.*	*Feet.*	*Sec.-ft.*
Oct. 24	Bert Harber[a]		0.95	42.4	Apr. 17	W. S. Daniels	2.59	2.65	445
Nov. 18	do		.95	41.5	24	Bert Harber	2.62	2.70	437
Dec. 14	Daniels and				26	W. S. Daniels	2.81	2.90	625
	Greenslet[b]		.84	33.9	May 10	do	2.62	2.68	464
23	Bert Harber		[b] 1.25	63.4	22	do	2.46	2.55	392
Jan. 24	do		[c] 1.55	52.2	26	Bert Harber	2.40	2.50	329
26	E. R. Greenslet		[c] 1.35	36.0	June 17	do	2.32	2.35	316
Feb. 28	Bert Harber		[c] 1.25	69.6	27	W. S. Daniels	1.84	1.90	180
Mar. 7	Daniels and				July 10	do	1.35	1.39	95.0
	Greenslet		1.03	50.1	28	Bert Harber	1.04	1.05	54.1
16	W. S. Daniels		2.18	277	Aug. 1	W. S. Daniels	.98	1.02	47.8
20	Bert Harber		2.80	498	Sept. 16	do	.82		32.0
Apr. 11	W. S. Daniels	2.71	2.79	497					

[a] Employee of Chewacan Land & Cattle Co.
[b] Employees of Northwest Townsite Co.
[c] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Chewaucan River near Paisley, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	26	28	44	46	25	83	250	490	330	178	48	33
2	27	28	59	46	26	75	244	520	310	172	47	32
3	25	28	58	46	33	75	210	580	310	152	46	36
4	25	32	64	37	37	79	199	645	330	137	46	38
5	25	31	47	37	37	76	210	715	350	126	48	39
6	25	25	57	46	42	59	227	715	372	120	46	41
7	26	20	56	46	54	76	330	645	372	112	43	38
8	25	25	50	46	63	80	392	580	395	106	42	36
9	26	27	46	37	63	114	379	550	418	102	43	35
10	26	27	32	37	114	164	415	465	418	97	42	36
11	26	38	40	37	106	206	492	418	395	91	41	36
12	26	33	36	37	98	259	406	395	350	87	48	36
13	27	26	55	37	95	232	370	372	330	84	48	35
14	28	30	42	37	95	222	350	350	330	80	47	34
15	29	33	33	46	109	262	440	350	310	78	44	33
16	27	36	29	46	120	370	406	350	330	75	44	32
17	26	44	42	46	130	392	384	372	310	92	49	31
18	25	43	52	46	135	440	330	440	310	90	53	30
19	27	43	57	46	125	520	323	418	275	77	49	30
20	29	46	76	46	124	550	280	395	245	73	45	30
21	33	46	98	46	120	392	274	395	245	68	44	30
22	34	41	83	46	127	350	323	372	220	64	42	30
23	36	48	57	46	116	290	323	395	195	61	41	30
24	40	44	42	57	111	230	430	395	184	59	39	31
25	35	41	57	63	111	232	492	395	178	57	37	31
26	33	34	23	52	118	233	530	372	174	57	37	32
27	31	42	33	45	118	235	610	372	184	57	36	32
28	29	34	69	38	88	210	610	350	168	56	36	32
29	31	83	69	31	80	205	520	330	156	54	37	32
30	30	58	29	25		200	509	330	168	51	36	32
31	29		37	24		210		330		49	35	

NOTE.—Record, Oct. 1 to Apr. 30 from ZX gage; May 1 to Sept. 30 from Geological Survey gage. Daily discharge Mar. 24 and 30 determined from readings on Survey gage. Stage-discharge relation affected by ice Nov. 14, 15, Dec. 15 to Feb. 12; discharge estimated from gage heights, discharge measurements, observer's notes, and weather records.

Monthly discharge of Chewaucan River near Paisley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	40	25	28.6	1,760
November	83	20	37.1	2,210
December	98	23	50.7	3,120
January	63	24	42.6	2,620
February	135	25	90.3	5,190
March	550	59	230	14,100
April	610	199	375	22,300
May	715	330	445	27,400
June	418	156	289	17,200
July	178	49	89.1	5,480
August	53	35	43.2	2,660
September	41	30	33.4	1,990
The year	715	20	146	106,000

CHEWAUCAN RIVER AT NARROWS, NEAR PAISLEY, OREG.

Location.—In the NE. ¼ sec. 24, T. 34 S., R. 19 E., at a constriction in Chewaucan Marsh known as The Narrows, one-eighth mile below the lower end of outside canal and 12 miles southeast of Paisley, Lake County. Moss Creek enters upper marsh but seldom contributes any water to the river.

Drainage area.—Not measured.

Records available.—January 18, 1914, to September 30, 1916.

Gage.—Chewacan Land & Cattle Co. (ZX) gages: January 18, 1914, to March 23, 1916, vertical staff on left bank on old channel, in NW. ¼ sec. 19, T. 34 S., R. 20 E.; March 24 to September 30, 1916, vertical staff on left bank just below outlet of outside canal. Gage reader W. W. Hampton.

Northwest Townsite Co. gages: Used ZX gage January 18, 1914, to March 25, 1916; March 27 to June 3, vertical staff about one-fourth mile below original ZX gage; June 3 to August 19, vertical staff just east of original ZX gage, in backwater of dredging operations; August 19 to September 30, vertical staff on right bank just below highway bridge, which was erected in 1916. Gage reader, Mrs. B. A. Webster.

Discharge measurements.—Made by wading at low and medium stages; at high water, from plank projecting from a wagon drawn across river by a horse on shore, or from a boat.

Channel and control.—At original ZX gage up to March 23, and at Northwest Townsite Co. gage March 27 to June 3, natural channel of gravel; somewhat shifting. At ZX gage beginning March 24 and at Northwest Townsite Co. gages beginning June 3, dredged canal, fairly permanent, but stage-discharge relation affected by dredging operations below until about August 18, after which time it was fairly stable.

Extremes of discharge.—Maximum stage recorded during year, 3.8 feet on ZX gage, 3.05 feet on second Northwest Townsite Co. gage, May 10 (discharge, 366 second-feet); minimum stage recorded, 0.8 foot October 7 and 8 (discharge, 6 second-feet).

1914–1916: Maximum stage recorded, 3.50 feet April 20, 21, and 24, 1914 (discharge, 505 second-feet); minimum stage recorded, 0.22 foot September 8–10 1915 (channel dry).

Ice.—Stage-discharge relation affected for short periods; ice effect less severe than usual, as dredge was working just above station and flow was regulated sufficiently to keep shore ice loosened and flushed out.

Diversions.—About 6,200 acres of uplands and 14,300 acres of marsh hay land are irrigated between the station above Paisley and this station.

REGULATION.—Discharge varies considerably owing to the manipulation of dams and ditches used for irrigating marsh and bordering lands and to operation of dredge, which was cutting a new channel for the river and approaching the gage from above until about the middle of March.

ACCURACY.—Stage-discharge relation at original ZX gage changed in December; unstable after March 15; at second ZX gage unstable until August 18; at Northwest Townsite Co. gages fairly permanent. A number of well-defined and fairly well defined rating curves were developed for the various periods of records. ZX gages read once daily to half-tenths by W. W. Hampton and, until March 25, three times a week to hundredths by Mrs. Webster; mean of readings used when both observers visited the gage the same day. Northwest Townsite Co. gages read three times a week to hundredths. Daily discharge ascertained by applying to rating table the mean daily gage height and by indirect method for shifting control. Records good except for January and March, for which months they are fair.

COOPERATION.—Part of discharge measurements and gage readings furnished by Chewacan Land & Cattle Co., W. C. Hammatt, engineer, and part by the Northwest Townsite Co.

Discharge measurements of Chewaucan River at Narrows, near Paisley, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.					Discharge.
		Original ZX gage.	Second ZX gage.	First Northwest Townsite Co. gage.	Second Northwest Townsite Co. gage.	Gage at bridge.	
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sec.-ft.*
Oct. 20	W. S. Daniels [a]	0.97					16.0
26	Bert Harber [b]	1.05					20.1
Nov. 5	W. S. Daniels	1.10					25.7
19	Bert Harber	1.25					43.5
Dec. 3	W. S. Daniels	1.23					41.3
28	Bert Harber	.95					18.8
29	E. R. Greenslet [a]	1.11					31.9
Jan. 26	Bert Harber	1.15					46.3
28	E. R. Greenslet	1.46					46.7
Feb. 17	do	1.40					96
25	Bert Harber	1.40					79
Mar. 8	W. S. Daniels	1.22					59
24	Bert Harber		3.00				127
Apr. 4	Daniels & Beane		[c] 3.00	2.49			226
12	W. S. Daniels		[c] 3.55	2.96			331
25	Bert Harber		3.20				265
28	W. S. Daniels		[c] 3.20	2.93			336
May 9	do		[c] 3.75	3.00			351
20	do		[c] 2.90	2.67			267
27	Bert Harber		1.55	[c] 2.28			103
June 3	W. S. Daniels		[c] 1.25	1.47	2.47		126
15	do		[c] .50		1.64		119
19	Bert Harber		.45		[c] 1.62		107
29	W. S. Daniels		[c] .25		1.38		98
July 13	do		[c] −.40		.70		62
25	do		[c] −1.25		−.21		31.6
29	Bert Harber		−1.55		[d] −.57		20.6
Aug. 5	W. S. Daniels		[c] −1.50		−.50		19.2
18	Bert Harber		−1.65				21.5
19	Daniels & Finch		[c] −1.25		−.56	1.00	39.9
22	do		[c] −1.45			.83	32.2
Sept. 11	W. S. Daniels		[c] −1.70			.53	17.2
21	F. F. Henshaw		[c] −1.80			.47	12.9

[a] Employee of Northwest Townsite Co.

[b] Employee of Chewaucan Land & Cattle Co.

[c] Observer's reading for day.

[d] Observer's reading for previous day.

Daily discharge, in second-feet, of Chewaucan River at Narrows, near Paisley, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	22	22	33	9	24	38	182	308	130	106	33	18
2	17	22	60	12	24	31	211	261	126	109	32	18
3	10	26	50	12	24	46	208	214	126	108	29	18
4	10	26	68	38	24	46	228	242	129	114	28	18
5	10	26	44	25	24	55	211	270	132	138	20	18
6	11	26	50	24	31	46	205	283	134	129	18	18
7	12	17	44	24	46	46	199	295	138	111	16	18
8	12	22	54	31	52	57	226	308	144	98	18	18
9	6	26	51	38	46	38	254	355	145	91	21	18
10	6	19	33	38	65	55	282	366	140	82	18	18
11	33	14	26	38	135	85	316	333	136	73	18	18
12	17	40	26	24	95	155	350	304	130	66	17	19
13	14	22	66	31	95	185	308	280	123	62	17	20
14	17	17	51	31	99	145	329	258	115	60	17	20
15	16	32	38	24	95	139	350	240	114	57	18	18
16	17	32	32	24	97	160	329	232	111	55	18	17
17	17	33	32	24	95	180	308	224	112	54	18	15
18	16	44	26	24	91	180	302	250	111	54	23	14
19	17	45	22	24	85	230	295	298	112	52	40	12
20	17	44	26	24	85	260	222	264	106	50	37	10
21	14	37	55	24	97	230	226	222	104	50	34	12
22	14	45	89	24	95	160	231	180	100	38	31	16
23	17	51	95	38	99	140	235	163	98	34	22	15
24	17	45	65	38	95	127	240	217	94	31	20	13
25	22	26	52	38	79	141	268	225	92	28	20	12
26	22	37	38	46	85	156	295	167	91	27	20	13
27	24	28	30	38	95	170	308	148	92	25	20	16
28	26	17	20	46	75	170	320	140	94	20	20	16
29	22	28	32	31	46	171	316	126	98	20	20	16
30	22	44	24	31	......	162	312	131	94	30	20	16
31	17	......	11	24	......	154	......	128	......	33	20	......

NOTE.—Daily discharge computed from records at ZX gage Oct. 1 to Mar. 26; from records at Northwest Townsite Co. gage Mar. 27 to May 8, and from the means of the two records May 9 to Sept. 30. The two records disagree materially for period May 26–29 only; during this time it is probable that some water temporarily ponded by the operation of the dredge was being released. Stage-discharge relation affected by ice Dec. 29–31, Jan. 6–7, 10–23, Jan. 27 to Feb. 6, and Feb. 22 to Mar. 2; daily discharge estimated from discharge measurements, observer's notes, and temperature records.

Monthly discharge of Chewaucan River at Narrows, near Paisley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	33	6	16.6	1,020
November	51	14	30.4	1,810
December	95	11	43.3	2,660
January	46	9	28.9	1,780
February	135	24	72.3	4,160
March	260	31	128	7,870
April	350	182	269	16,000
May	366	126	240	14,800
June	145	91	116	6,900
July	138	20	64.7	3,980
August	40	16	22.6	1,390
September	20	10	16.3	970
The year	366	6	87.1	63,300

CHEWAUCAN RIVER AT HOTCHKISS FORD, NEAR PAISLEY, OREG.

LOCATION.—At a river crossing known as Hotchkiss Ford, near line between secs. 11 and 12, T. 35 S., R. 20 E., below lower Chewaucan Marsh, above Crooked Creek, and about 20 miles southeast of Paisley, Lake County. Willow Creek enters lower marsh but contributes water to it only during the early spring floods, the entire flow at other times being diverted for irrigation.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 18, 1914, to September 30, 1916.

GAGE.—Vertical staff on left bank. Gage readers, W. W. Hampton for Chewacan Land & Cattle Co., and Mrs. B. A. Webster for Northwest Townsite Co.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of fine gravel, sand, and mud; channel somewhat shifting. Growth of aquatic plants, mostly tules, affects stage-discharge relation most of the year. Banks low and river widens considerably at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.8 feet, May 26 and 27 (discharge, 260 second-feet); minimum stage recorded, 1.05 feet October 1 (discharge, 3.0 second-feet).

1914–1916: Maximum stage recorded, 4.50 feet April 24, 1914 (discharge, 400 second-feet); minimum stage recorded, 0.9 foot September 6, 1915; stream bed practically dry September 7 to 17, 1915.

ICE.—Stage-discharge relation seriously affected by ice.

DIVERSIONS.—About 7,800 acres of marsh hay land are irrigated between the Narrows and Hotchkiss Ford stations. A total of 28,300 acres is watered from the river above the station.

REGULATION.—Discharge may vary during irrigating season owing to manipulation of dams and ditches for irrigating the marsh.

ACCURACY.—Stage-discharge relation unstable owing to growth of aquatic plants, except August 9 to Setpember 30, when a well-defined rating curve was used. Gage read once daily to half-tenths by Chewacan Land & Cattle Co., and three times a week to hundredths by Northwest Townsite Co. Mean of two readings used for days when both observers visited gage. Daily discharge ascertained by applying to rating table the mean daily gage height, August 9 to September 30, and by shifting-control method the rest of year. Records good except for ice periods of December and January, for which they are only fair.

COOPERATION.—Part of field data furnished by Chewacan Land & Cattle Co., through W. C. Hammatt, consulting engineer, and part by Northwest Townsite Co.

Discharge measurements of Chewaucan River at Hotchkiss Ford, near Paisley, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	W. S. Daniels[a]	1.28	14.6	Apr. 28	W. S. Daniels	2.44	157
26	Bert Harber[b]	1.30	18.4	May 9	.....do	2.96	187
Nov. 5	W. S. Daniels	1.34	20.0	20	.....do	3.72	242
19	Bert Harber	1.45	41.9	28	Bert Harber	3.70	246
Dec. 3	W. S. Daniels	1.51	39.0	June 3	W. S. Daniels	2.90	114
28	Bert Harber	1.40	43.8	15	.....do	2.80	71
29	E. R. Greenslet[a]	1.60	25.3	20	Bert Harber	2.85	98
Jan. 27	Bert Harber	1.75	26.5	29	W. S. Daniels	2.90	66
28	E. R. Greenslet	1.66	32.6	July 13	.....do	3.20	80
Feb. 17	.....do	1.85	103	25	.....do	2.15	25.8
25	Bert Harber	1.80	92	29	Bert Harber	1.75	17.5
Mar. 8	W. S. Daniels	1.65	63	Aug. 5	Daniels and Finch	1.35	13.6
23	Bert Harber	1.95	104	17	Bert Harber	1.30	14.4
27	W. S. Daniels	1.50	59	19	W. S. Daniels	1.26	12.6
Apr. 12	.....do	2.60	183	Sept. 11	.....do	1.26	11.6
26	Bert Harber	2.15	104	21	F. F. Henshaw	1.19	8.7

[a] Employee of Northwest Townsite Co.

[b] Employee of Chewacan Land & Cattle Co.

Daily discharge, in second-feet, of Chewaucan River at Hotchkiss Ford, near Paisley, Oreg. for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.0	19	38	28	38	90	156	212	140	67	14	12
2	7.0	19	38	32	38	72	150	212	125	67	14	12
3	9.0	19	39	32	42	72	154	206	114	80	14	12
4	9.0	19	38	32	50	72	189	200	105	105	15	12
5	7.0	20	50	32	54	67	200	182	103	120	14	12
6	9.0	22	50	35	67	67	189	172	95	130	14	12
7	9.0	28	50	35	76	58	162	167	87	120	14	12
8	9.4	28	50	35	80	63	145	177	80	129	14	12
9	9.0	28	46	35	85	54	135	187	80	125	15	12
10	7.0	32	46	35	76	54	138	206	76	110	14	12
11	7.0	32	46	35	95	58	162	206	72	100	14	12
12	11	32	42	38	95	72	183	218	67	93	14	12
13	16	38	35	38	105	95	194	218	72	80	14	12
14	16	38	38	35	100	115	194	218	67	72	14	12
15	16	38	38	28	100	110	185	212	71	67	14	12
16	14	42	42	28	100	100	167	212	74	58	14	12
17	14	42	35	28	103	113	178	200	80	57	14	12
18	14	42	42	28	100	140	178	212	85	54	14	12
19	14	42	42	28	100	162	172	237	95	54	12	12
20	15	42	35	28	100	184	156	242	98	50	14	9
21	14	46	42	28	100	200	143	242	95	49	18	9
22	14	46	46	28	105	178	145	231	90	42	18	9
23	14	42	58	38	100	104	120	230	80	38	18	9
24	14	42	58	38	100	82	110	230	76	34	18	9
25	17	50	56	38	92	76	105	235	76	26	18	9
26	18	42	54	32	90	73	104	260	71	25	18	9
27	21	42	50	26	95	59	115	260	72	22	14	9
28	22	42	44	33	95	80	157	246	70	18	12	12
29	22	35	25	38	85	137	178	212	66	18	12	12
30	22	35	25	38	....	156	194	184	62	16	12	12
31	22	....	16	38	....	150	....	156	....	14	12	....

NOTE.—Stage-discharge relation affected by ice Nov. 10, 11, 13–17, 28, Dec. 1, 2, 11, 14–20, 26, 27, Jan. 29 to Feb. 2, Feb. 28 to Mar. 4, daily discharge ascertained from discharge measurements, observer's notes, and weather records. Daily discharge interpolated Sept. 7 and 9.

Monthly discharge of Chewaucan River at Hotchkiss Ford, near Paisley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	22	3.0	13.4	824
November	50	19	34.8	2,070
December	58	16	42.4	2,610
January	38	26	32.9	2,020
February	105	38	85.0	4,890
March	200	54	100	6,150
April	200	104	159	9,460
May	260	156	212	13,000
June	140	62	84.8	5,050
July	130	14	65.8	4,050
August	18	12	14.5	892
September	12	9	11.2	666
The year	260	3	71.3	51,700

CONN DITCH NEAR PAISLEY, OREG.

LOCATION.—In SE. ¼ sec. 27, T. 33 S., R. 18 E., just below road crossing, half a mile below intake of ditch, and about 2 miles southwest of Paisley, Lake County.

RECORDS AVAILABLE.—July 17, 1914, to September 30, 1916.

GAGE.—Vertical staff (ZX gage) owned by Chewacan Land & Cattle Co., on left or upper side of ditch about 40 feet below road bridge; also Northwest Townsite Co. vertical staff 20 feet upstream. Gage readers, A. A. Farrow (ZX gage) and W. S. Daniels (Townsite Co. gage).

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Ditch not particularly well built or maintained; control somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.64 feet on Northwest Townsite Co. gage, May 11 (discharge, 13 second-feet).

1914–1916: Maximum stage recorded, 1.75 feet July 20, 1914 (discharge, 19 second-feet). Canal dry at times.

ICE.—Water generally turned out of canal during extremely cold weather.

ACCURACY.—Stage-discharge relations for both gages not permanent. ZX gage read daily to half-tenths; Northwest Townsite Co. gage about three times a week to hundredths. Daily discharge ascertained by applying daily gage readings to rating table. Records fair.

COOPERATION.—Most of the gage readings and meter measurements furnished by the Chewacan Land & Cattle Co., W. C. Hammatt, consulting engineer, and some by the Northwest Townsite Co.

Conn ditch diverts from Chewaucan River in the S. E. ¼ sec. 27, T. 33 S., R. 18 E., about three-eighths mile below Mill Creek and the gaging station just above it. The water is used for irrigating 600 acres of the Conn ranch on a bench northwest of Paisley.

Discharge measurements of Conn ditch near Paisley, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.		Discharge.
		ZX gage.	N. T. Co. gage.	
		Feet.	*Feet.*	*Sec.-ft.*
Oct. 24	Bert Harber[a]	0.35		0.5
May 12	W. S. Daniels[b]		0.96	3.0
22	do		.42	.6
June 17	Daniels and Finch		1.30	10.7
18	Bert Harber	1.25	1.30	8.8
July 3	W. S. Daniels		1.02	6.3
July 28	Bert Harber	1.30	1.29	8.5
Aug. 1	W. S. Daniels		1.35	9.2
3	do	[c]1.10	1.16	6.7
16	Bert Harber	1.15		8.6
23	W. S. Daniels	[c].95	1.00	4.8
Sept. 22	F. F. Henshaw	.82	.84	3.5

[a] Employee of Chewacan Land & Cattle Co.

[b] Employee of Northwest Townsite Co.

[c] Observer's reading for day.

Daily discharge, in second-feet, of Conn ditch near Paisley, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.5	0.7	0.3	....	0.2	0.2	8.5	9.3	0.3
2	2.2	.3	.3	....	.2	.2	7.4	8.0	2.0
3	2.2	.3	.3	....	.2	.3	6.3	6.7	3.8
4	2.0	.3	.4	....	.2	.4	6.0	6.8	3.8
5	2.2	.3	.3	....	.2	.5	7.2	6.4	3.8
6	2.2	.3	.3	....	.2	.5	9.1	6.0	3.8
7	2.2	.3	.3	....	.2	.5	8.8	6.0	3.8
8	2.7	.3	.5	0.1	.1	.4	11.1	6.0	3.8
9	2.7	.3	.2	.1	.1	3.7	10.6	5.9	3.8
10	2.2	.3	.1	.1	.2	3.7	10.2	5.8	3.8
11	1.8	.2	.3	.1	13	3.6	9.2	5.6	3.8
12	3.0	.2	.2	.1	3.0	3.4	8.3	5.8	3.8
13	1.1	.1	.2	.2	2.7	3.3	8.8	5.4	3.2
14	2.7	.1	.2	.2	2.8	2.7	9.6	5.0	3.8
15	2.8	.1	.1	.2	3.0	3.2	9.0	8.5	4.3
16	2.7	.1	....	.2	3.1	10.7	8.5	6.7	3.8
17	2.2	.2	....	.2	3.1	10.7	9.4	6.8	3.8
18	2.2	.1	....	.2	1.9	8.8	10.4	1.4	3.8
19	1.4	.1	....	.2	.6	8.5	9.8	3.2	3.8
20	2.2	.1	....	.2	.6	8.2	9.3	4.9	3.8
21	1.3	.2	....	.2	.6	8.6	8.7	4.8	3.2
22	.2	.2	....	.3	.6	9.0	8.1	4.8	3.3
23	.4	.3	....	.3	.4	9.4	8.0	4.8	3.2
24	.5	.3	....	.3	.3	9.3	7.8	1.9	3.2
25	.3	.2	....	.3	.3	9.0	8.8	1.7	3.8
26	.2	.3	....	.2	.4	8.7	9.7	1.2	0
27	.1	.2	....	.2	.3	9.0	8.8	1.0	.1
28	.1	.2	....	.3	.3	8.7	8.5	.8	.1
29	.3	.3	....	.3	.3	9.2	8.9	.6	6.3
30	.2	.3	....	.2	.3	9.6	9.3	.5	6.3
31	1.0	....	....	....	.2	....	9.6	.4	....

NOTE.—Daily discharge ascertained as follows: Oct. 1 to Dec. 15, from gage readings on ZX gage and a fairly well defined rating curve; Apr. 11 to May 10, afternoon of May 18 to June 17, and July 1–25, from gage readings on Northwest Townsite Co. gage and a fairly well defined rating curve; May 11–17, estimated on account of obstruction caused by rock; June 18–30 and July 25 to Aug. 31, from gage readings on Northwest Townsite Co. gage and a rating curve well defined between 4 and 10 second-feet; Sept. 1–30, from readings on ZX gage and a fairly well defined rating curve. No flow Dec. 16 to Apr. 7 and Sept. 26.

Monthly discharge of Conn ditch near Paisley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	3.0	0.1	1.57	97
November	.7	.1	.24	14
December (15 days)	.5	.1	.27	8
April (23 days)	.3	.1	.20	9
May	13	.1	1.28	79
June	10.7	.2	5.47	326
July	11.1	6.0	8.83	543
August	9.3	.5	4.60	283
September (29 days)	6.3	.1	3.45	198
The year	....	....	....	1,560

NOTE.—See footnote to daily discharge table.

SMALLS CREEK AT PAISLEY, OREG.

LOCATION.—In SW. ¼ sec. 24, T. 33 S., R. 18 E., in western part of Paisley, Lake County, just above road bridge, about 200 yards below point of diversion from Chewaucan River, and about same distance above head gate of Bagley ditch.

RECORDS AVAILABLE.—January 18, 1914, to September 30, 1916.

GAGE.—Vertical staff on right bank. An old gage was used up to June 28, 1914. Gage readers, Bert Harber, A. A. Farrow, and W. S. Daniels.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—A natural stream channel, narrow, with well-defined banks, fairly straight, with gravel bed; shifts only at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.0 feet May 23, 24, June 5 and 6 (discharge, 76 second-feet); minimum stage recorded, 0.4 foot February 29 and March 1 (discharge, 0.2 second-foot).

1914–1916: Maximum stage recorded, 2.2 feet May 15, 1914 (discharge, 107 second-feet); minimum stage recorded, 0.4 foot November 11, 1914, and February 29 and March 1, 1916 (discharge, 0.2 second-foot).

ICE.—Stage-discharge relation seriously affected by ice.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read once a day by Harber and Farrow to half-tenths; occasionally by Daniels to hundredths. Daily discharge ascertained by applying to rating table the mean daily gage height. Records good for irrigating season; poor for other times.

COOPERATION.—Field data furnished by Chewacan Land & Cattle Co., W. C. Hammatt, consulting engineer, and by Northwest Townsite Co.

Smalls Creek is a natural slough or defluent of Chewaucan River and has been converted into an irrigation canal. It diverts water from the river in the SW. ¼ sec. 24, T. 33 S., R. 18 E., and irrigates 2,417 acres of the alluvial fan of Chewaucan River above the upper marsh, including 1,209 acres watered from Bagley ditch, which diverts water from Smalls Creek a short distance from the river. The irrigation season extends from about April 1 to September 15. Water is diverted at other times for watering stock. Surplus and return waters find their way to the marsh.

Discharge measurements of Smalls Creek at Paisley, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 30	W. S. Daniels[a]	0.67	1.8	Apr. 24	Bert Harber	1.30	25.2
Nov. 18	Bert Harber[b]	.85	4.2	May 22	W. S. Daniels	1.95	70
Dec. 23	.....do	.90	8.5	26	Bert Harber	1.90	67
Jan. 25	.....do	1.15	1.4	June 17	.....do	1.80	64
Feb. 7	E. R. Greenslet[a]	1.10	2.0	July 28	.....do	1.25	21.8
28	Bert Harber	.60	1.5	Aug. 16	.....do	1.15	15.1
Mar. 20	.....do	.90	7.5	Sept. 21	F. F. Henshaw	.93	8.2
28	W. S. Daniels	.80	4.4	21	Bert Harber	.93	8.7
Apr. 14	.....do	1.35	27.8				

[a] Employee of Northwest Townsite Co.

[b] Employee of Chewacan Land & Cattle Co.

Daily discharge, in second-feet, of Smalls Creek at Paisley, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12	2.8	6.0	3.0	2.0	0.2	5.0	20	67	51	14	12
2	7.0	3.0	7.0	5.0	2.0	.5	4.0	20	63	47	12	10
3	7.0	3.0	8.5	5.0	2.0	.8	5.0	20	63	30	12	10
4	8.5	3.0	9.4	5.0	2.0	1.0	5.0	55	67	26	12	12
5	8.5	3.0	7.0	5.0	2.0	2.4	5.0	59	74	19	14	14
6	8.5	2.7	8.5	5.0	2.0	1.0	16	59	76	30	12	14
7	8.5	.6	7.0	5.0	2.0	1.0	18	51	55	45	12	14
8	8.5	2.0	6.8	5.0	2.0	3.0	20	48	59	43	12	13
9	8.5	1.5	6.0	5.0	2.0	4.0	23	43	63	36	13	12
10	10	1.0	5.0	5.0	2.0	9.4	24	36	63	37	12	12
11	10	1.5	5.0	6.0	2.0	20	29	30	55	32	10	10
12	10	1.5	5.0	8.0	2.0	13	23	26	51	32	16	7.0
13	6.0	.6	5.0	6.0	1.5	10	20	26	47	26	16	7.0
14	6.0	1.4	1.6	5.0	2.2	9.4	24	23	43	29	16	7.0
15	6.0	3.0	3.0	5.0	2.2	10	29	23	43	26	14	7.0
16	6.0	2.2	8.5	4.0	2.2	10	23	24	57	23	14	6.0
17	6.0	3.0	5.0	4.0	4.0	10	27	26	57	40	16	10
18	6.0	4.2	7.0	4.0	5.0	10	20	33	57	32	7.0	10
19	7.0	5.2	8.5	3.0	5.0	10	19	67	51	26	6.0	14
20	7.0	6.0	10	3.0	5.0	7.0	18	69	45	23	6.0	6.0
21	8.5	6.0	8.5	3.0	5.0	6.0	20	72	40	14	6.0	7.0
22	8.5	5.4	8.5	2.0	4.0	5.0	20	67	32	23	6.0	8.5
23	10	6.0	7.0	2.0	5.0	5.0	20	76	29	23	5.8	10
24	7.0	5.8	4.0	2.0	2.2	4.6	25	74	29	13	10	10
25	7.0	6.0	7.0	1.4	3.0	5.0	29	72	51	14	10	5.0
26	7.0	5.0	3.0	1.5	4.0	4.0	21	69	44	12	10	5.0
27	7.0	4.0	1.5	1.5	3.0	5.0	20	67	55	20	12	5.0
28	6.2	1.5	3.0	1.5	1.5	5.0	20	67	45	20	12	7.0
29	6.0	3.0	3.0	1.5	.2	4.0	19	69	36	19	12	6.0
30	4.6	5.0	3.0	1.5	......	4.0	18	63	47	18	12	6.0
31	3.0	......	3.0	1.5	......	4.0	......	67	......	14	12	......

Monthly discharge of Smalls Creek at Paisley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	12.0	3.0	7.48	460
November	6.0	.6	3.30	196
December	10.0	1.5	5.85	360
January	8.0	1.4	3.72	229
February	5.0	.2	2.72	156
March	20.0	.2	5.95	366
April	29.0	4.0	19.0	1,130
May	76.0	20.0	49.1	3,020
June	76.0	29.0	52.1	3,100
July	51.0	12.0	27.2	1,670
August	16.0	5.8	11.4	701
September	14	5.0	9.22	549
The year	76.0	.2	16.5	10,900

BAGLEY DITCH AT PAISLEY, OREG.

LOCATION.—In SW. ¼ sec. 24, T. 33 S., R. 18 E., just below head gate, in Paisley, Lake County.

RECORDS AVAILABLE.—January 18, 1914, to September 30, 1916.

GAGE.—Vertical staff on left bank. Gage readers, Bert Harber and Richard Guinee.

DISCHARGE MEASUREMENTS.—Made by wading or from plank across ditch at gage.

CHANNEL AND CONTROL.—Earth channel; control unstable.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.95 feet May 23 to 25, 27, and June 5 and 6 (discharge, 40 second-feet). Canal dry at times.

1914–1916: Maximum stage recorded, 2.5 feet May 15, 1914 (discharge, 68 second-feet.)

ICE.—Stage-discharge relation affected by ice. Only a small amount of water is carried in extremely cold weather.

ACCURACY.—Stage-discharge relation changed during ice period and again when ditch was cleaned out, April 26 to May 5. Three fairly well defined rating curves used October 1 to February 11, February 12 to April 25, and May 6 to September 30, respectively. Gage read daily to half-tenths. Daily discharge ascertained by applying daily gage height to rating table. Records good for irrigating season; fair for rest of year.

COOPERATION.—Field data furnished by Chewacan Land & Cattle Co., W. C. Hammatt, consulting engineer.

Bagley ditch (sometimes called Brattain ditch) diverts water from Smalls Creek in the SW. ¼ sec. 24, T. 33 S., R. 18 E., a few hundred yards below the point where Smalls Creek diverts from Chewaucan River; extends 6 miles in a southerly direction, and irrigates 1,209 acres lying above the area watered by Smalls Creek. Return and waste waters reach upper Chewaucan Marsh. The irrigation season extends from late in March or early in April to about September. Water is diverted for stock throughout the year.

Discharge measurements of Bagley ditch at Paisley, Oreg., during the year ending Sept. 30, 1916.

[Made by Bert Harber.[a]]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 24	1.10	5.8	Mar. 20	1.00	5.6	July 28	1.35	18.4
Nov. 18	.95	3.3	Apr. 24	1.55	13.4	Aug. 16	1.00	11.2
Dec. 23	1.15	4.8	May 7	1.60	29.6	Sept. 21	.81	6.6
Jan. 25	1.05	.7	May 26	1.90	37.5			
Feb. 28	.70	1.0	June 17	1.65	31.9			

[a] Employee of Chewacan Land & Cattle Co.

Daily discharge, in second-feet, of Bagley ditch at Paisley, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.2	1.0	6.0			3.8		38	30	12	10
2	5.2	1.0	6.0		2.4	3.8		37	28	11	9.0
3	3.5	1.4	7.0		5.3	3.8		38	24	12	9.0
4	3.5	1.0	8.0		.4	3.8		38	22	11	11
5	3.5	1.0	7.0		2.4	3.8		40	14	12	15
6	3.5	1.0	7.0		.5	12	11	40	7	12	12
7	3.5		7.0		3.8	13	28	35	26	12	12
8	3.5	.8	7.0		3.1	14	26	32	26	11	11
9	3.5	.6	6.0		1.7	15	26	32	26	12	11
10	4.3	.6	4.3		6.0	16	24	32	25	12	11
11	4.3	.6	5.2		9.0	19	22	32	25	11	11
12	5.2	.6	5.2	2.4	6.8	11	19	28	24	16	6.2
13	3.5	.1	6.0	1.7	6.8	11	19	26	22	15	6.2
14	3.5	.4	1.7	2.4	5.3	13	18	26	19	15	5.3
15	3.5	2.2	3.5	2.4	6.0	14	18	30	19	15	5.3
16	4.3	1.7	5.2	2.4	6.8	13	19	30	19	14	5.3
17	4.3	2.7	3.5	3.8	6.0	14	19	30	25	10	9.0
18	4.3	3.5	4.3	4.6	6.8	11	22	30	24	5.3	9.0
19	5.2	3.7	4.3	4.6	6.8	11	37	28	24	4.6	11
20	6.0	3.5	4.3	3.8	5.3	11	38	26	16	4.0	6.2
21	7.0	4.3	4.3	3.8	5.3	11	38	25	14	4.0	7.0
22	8.0	4.1	4.3	3.8	4.6	12	38	22	18	4.0	7.0
23	9.0	6.0	4.8	3.1	3.8	13	40	20	15	4.0	8.0
24	6.0	4.3	3.0	1.7	3.8	14	40	20	14	9.0	10
25	5.2	5.2	3.0	2.4	3.8	13	40	28	11	9.0	3.4
26	5.2	4.3	2.0	3.1	3.8		38	26	11	9.0	4.0
27	5.2	3.5	1.0	3.1	3.8		40	30	19	10	4.0
28	4.3	1.0	2.0	1.0	3.8		38	26	20	10	7.0
29	4.3	6.4	2.0		3.8		38	24	19	11	4.6
30	4.3	6.0	2.0		3.4		37	25	19	11	4.0
31	1.4		2.0		3.1		38		12	11	

NOTE.—Mean discharge estimated Jan. 1-21 and Feb. 7-11, 2 second-feet; Jan. 22-24 and Jan. 26 to Feb. 6, 1 second-foot; Dec. 18-31, as in table. Canal dry Nov. 7, Feb. 29, Mar. 1, and Apr. 26 to May 5.

Monthly discharge of Bagley ditch at Paisley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	9.0	1.4	4.62	284
November (29 days)	6.4	.1	2.50	144
December	8.0	1.0	4.48	276
January			1.67	103
February (28 days)	4.6	1.0	2.36	131
March (30 days)	9.0	.4	4.47	266
April (25 days)	19	3.8	11.2	555
May (26 days)	40	11	29.7	1,530
June	40	20	29.8	1,770
July	30	7.0	19.9	1,220
August	16	4.0	10.3	633
September	15	3.4	8.15	485
The year				7,400

NOTE.—See footnote to daily discharge table.

JONES-INNIS-ZX DITCH NEAR PAISLEY, OREG.

LOCATION.—In NW. ¼ sec. 19, T. 33 S., R. 19 E., about 100 yards below intake and a mile east of Paisley, Lake County.

RECORDS AVAILABLE.—July 20, 1914, to September 30, 1916.

GAGE.—Vertical staff; read by Bert Harber and A. A. Farrow.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Channel excavated in gravel; control fairly permanent. Stage-discharge relation affected at times by growth of aquatic plants.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.85 feet June 7 to 10 (discharge, 120 second-feet). Canal dry at stage of about 0.6 foot March 15, and July 5 to August 3.

ICE.—Stage-discharge relation badly affected by ice during winter; discharge at such times is very small.

ACCURACY.—Stage-discharge relation permanent except for period April to June, when there was backwater caused either by growth of aquatic plants or by operation of check gates. Rating curve well defined. Gage read once daily to half-tenths. Daily discharge ascertained by applying daily gage height to rating table, except April 28 to June 25, when indirect method for shifting control was used. Records good during irrigating season; poor rest of year.

COOPERATION.—Field data furnished by Chewacan Land & Cattle Co.

Jones-Innis-ZX ditch (so called from the largest water users under it, ZX being the common name of the Chewacan Land & Cattle Co.'s ranch) diverts water from Chewaucan River in the NW. ¼ sec. 19, T. 33 S., R. 19 E., into natural sloughs, from which is irrigated an area of 2,218 acres of the lowest part of the alluvial fan of Chewaucan River immediately above the upper marsh. One of these, Paisley Slough, at its lower end discharges into the "Stock ditch" which is used for irrigation and watering cattle. The irrigating season extends from early in April to about July 1. Water is diverted practically the entire year for either irrigation or stock.

Discharge measurements of Jones-Innis-ZX ditch near Paisley, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 24	Bert Harber	1.45	11.5	May 8	Daniels and Finch	2.70	96
Nov. 19	.....do	1.10	3.0	16	W. S. Daniels	2.33	75
Mar. 21	.....do	.95	3.4	30	Bert Harber	2.60	96
21	.....do	.95	1.3	June 7	Daniels and Finch	2.81	114
Apr. 13	W. S. Daniels	.85	.5	18	Bert Harber	2.65	98
26	.....do	2.53	97	20	W. S. Daniels	2.49	89
26	Bert Harber	2.55	97	July 3	.....do	2.29	76

Daily discharge, in second-feet, of Jones-Innis-ZX ditch near Paisley, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.0	3.0	3.0	......	1.7	0.8	86	92	76	......	1.7
2	2.4	4.0	3.0	......	1.2	.8	99	103	76	......	1.2
3	4.0	4.0	3.0	......	1.7	.8	103	103	70	......	1.2
4	4.9	4.0	3.0	......	1.2	.8	103	103	65	1.7	1.7
5	4.9	4.0	3.0	......	1.2	.8	81	112	......	1.7	1.7
6	4.9	4.0	3.0	......	.8	.8	76	114	......	1.7	1.7
7	4.9	3.0	3.0	......	1.2	.8	81	114	......	1.7	1.5
8	4.9	3.0	3.0	......	.8	.9	96	120	......	1.7	1.4
9	4.0	3.0	3.0	......	1.2	.8	92	120	......	1.7	1.3
10	4.0	.2	2.4	......	2.4	.8	76	120	......	1.7	1.2
11	4.9	4.0	4.0	......	1.2	.6	64	114	......	1.2	1.7
12	4.9	3.0	3.0	......	.3	.6	60	108	......	.8	1.7
13	7.2	3.0	3.0	......	.3	.6	60	103	......	1.7	1.2
14	7.2	3.0	2.4	......	.3	.6	60	103	......	1.2	1.2
15	7.2	3.0	2.4	......	......	.6	65	98	......	1.2	4.0
16	6.0	3.0	3.0	......	1.7	17	72	98	......	1.2	7.2
17	6.0	3.0	3.0	......	.3	22	70	92	......	1.7	7.2
18	7.2	3.0	3.0	......	1.7	18	88	98	......	1.7	6.0
19	7.2	3.0	3.0	......	1.7	16	82	95	......	1.2	6.0
20	6.0	3.0	3.0	0.8	1.4	15	76	89	......	1.2	4.9
21	6.0	3.0	4.0	.8	1.2	71	56	86	......	1.2	4.9
22	6.0	3.0	3.0	.8	.8	81	98	81	......	1.7	4.9
23	7.2	3.0	4.0	1.7	1.2	86	103	76	......	1.7	8.6
24	12	3.0	4.0	1.7	1.7	96	100	70	......	1.7	7.2
25	8.6	3.0	3.0	1.7	.6	70	98	70	......	1.7	8.6
26	7.2	1.7	4.0	1.7	.3	88	92	56	......	1.7	8.6
27	4.0	1.2	3.0	1.7	.3	114	98	60	......	1.7	10
28	4.0	.3	3.0	1.2	.3	103	93	56	......	1.7	10
29	3.0	3.0	3.0	1.2	.6	84	86	65	......	1.7	10
30	3.0	3.0	3.0	......	.4	92	96	70	......	1.7	8.6
31	3.0	......	3.0	......	.3	......	94	......	......	1.7	......

NOTE.—Stage-discharge relation affected by ice Dec. 28 to Feb. 19; mean discharge estimated as 3 second-feet Dec. 28-31 and 1 second-foot Jan. 1 to Feb. 19. No flow March 15 and July 5 to Aug. 3. Daily discharge interpolated Sept. 7-9.

Monthly discharge of Jones-Innis-ZX ditch near Paisley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	12	2.4	5.47	336
November	4.0	.2	2.91	173
December	4.0	2.4	3.10	191
January			1.0	62
February	1.7		1.11	64
March (30 days)	2.4	.3	1.00	60
April	114	.6	32.8	1,950
May	103	56	84.0	5,160
June	120	56	93.0	5,530
July (4 days)	76	65	71.8	570
August (28 days)	1.7	.8	1.54	86
September	10	1.2	4.57	272
The year				14,500

SILVER LAKE BASIN.

SILVER CREEK NEAR SILVER LAKE, OREG.

Location.—In SW. ¼ sec. 28, T. 28 S., R. 14 E., at dam site of proposed Egli reservoir, 1½ miles southwest of Silver Lake post office, Lake County, and about 3 miles above mouth of Bridge Creek.

Drainage area.—221 square miles.

Records available.—December 29, 1904, to March 31, 1907, January 11, 1909, to September 30, 1916.

Gage.—Inclined staff on right bank, read since July 24, 1915; vertical staff on right bank, 10 feet upstream, used April 5, 1912, to July 23, 1915; inclined staff at location of present gage, 1905 to 1912. Gage reader, J. H. Gowdy.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Composed of rocks and gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 5.7 feet at 9.30 a. m. March 20 (discharge, 710 second-feet); minimum stage recorded during year, 0.15 foot October 9 (discharge, 0.8 second-foot).

1905–1907 and 1909—1916: Maximum stage recorded, 6.40 feet at 4 p. m. November 23, 1909 (discharge, 910 second-feet); minimum stage recorded, 0.15 foot August 7–8 and October 9, 1915 (discharge, 0.8 second-foot).

Ice.—Stage-discharge relation somewhat affected by ice.

Diversions.—A few small tracts irrigated above the station.

Regulation.—None.

Accuracy.—Stage-discharge relation changed during high water, the change affecting only medium and low stages. Fairly well defined rating curves used; identical above gage height 2.5 feet. Gage read to quarter-tenths daily February 10 to June 30 and about three times a week at other times. Daily discharge ascertained by applying daily gage height to rating table. Records only fair on account of diurnal fluctuation during spring flood and uncertainty of rating at other times.

Discharge measurements of Silver Creek near Silver Lake, Oreg., during the year ending Sept. 30, 1916.

[Made by Henshaw and Batchelder.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 3	0.28	1.8
3	.28	1.5
June 11	1.07	31.0

Daily discharge, in second-feet, of Silver Creek near Silver Lake, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.5	1.5	......	......	19	217	138	47	30	......	......
2	1.5	1.5	8.0	......	19	192	148	47	......	14	11
3	1.8	1.5	......	......	17	192	158	44	27	......	11
4	......	1.5	19	......	15	192	158	44	27	13	......
5	1.0	1.5	......	......	13	217	148	44	......	13	11
6	......	1.5	5.0	......	15	290	138	41	25	......	......
7	1.0	1.5	19	......	19	204	138	41	23	12	......
8	1.0	1.5	......	......	21	245	120	41	21	......	10
9	.8	1.4	8	......	45	360	102	38	......	11	......
10	1.5	1.2	......	......	100	420	98	32	21	......	10
11	......	1.1	5.0	......	169	400	86	32	......	11	......
12	......	1.0	......	......	148	231	78	30	20	13	10
13	......	.8	4.6	......	180	217	68	28	19	......	......
14	1.8	1.1	......	......	158	260	64	30	22	13	10
15	......	1.3	......	11	138	245	57	30	21	......	......
16	2.0	1.5	......	13	148	231	57	30	21	13	10
17	2.0	1.5	......	15	158	275	57	30	21	9.5	10
18	......	1.5	......	15	217	260	57	31	......	......	......
19	......	2.0	......	17	520	231	57	30	19	9.5	......
20	2.0	2.0	......	21	710	148	57	30	......	......	......
21	......	2.0	5.0	21	560	120	57	30	19	9.5	......
22	......	2.0	......	23	380	180	47	31	17	......	9.5
23	1.5	4.0	6.5	25	306	180	50	31	......	9.5	......
24	1.5	5.0	......	25	217	148	64	30	15	......	9.5
25	......	5.0	5.0	27	169	192	57	30	......	......	......
26	......	4.6	5.0	33	138	192	60	32	15	8.0	......
27	1.5	3.0	......	30	217	158	94	27	......	8.0	......
28	......	2.0	......	25	169	148	138	27	15	......	9.5
29	......	3.5	......	21	169	148	68	27	14	9.5	......
30	1.5	5.0	......	......	169	138	57	27	......	......	......
31	1.5	......	......	......	158	......	57	......	14	......	......

NOTE.—Stage-discharge relation affected by ice Nov. 12, 13, Dec. 15–20, and Dec. 28 to Feb. 14; mean discharge estimated from observer's notes and temperature records as follows: Dec. 15, 18, and 19, 4 second-feet; and Dec. 28 to Feb. 5, 3 second-feet; Feb. 6–14, 6 second-feet. Daily discharge interpolated Nov. 1–3, 5, 7, 9, 10, 15, 27, and 29.

Monthly discharge of Silver Creek near Silver Lake, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	......	0.8	a 1.49	92
November	5.0	.8	2.15	128
December	......	......	a 7.01	431
January	......	......	b 3.0	184
February	33	......	13.5	776
March	710	13	177	10,900
April	420	120	221	13,200
May	158	47	88.2	5,420
June	47	27	33.7	2,010
July	30	14	a 20.3	1,250
August	......	......	a 11.0	676
September	......	......	a 10.1	601
The year	710	.8	49.0	35,700

a Computed as the mean of actual number of days on which discharge is given for the month.
b Estimated.

MALHEUR AND HARNEY LAKES BASIN.

MALHEUR LAKE OUTLET AT NARROWS, OREG.

LOCATION.—In sec. 26, T. 26 S., R. 31 E., at highway bridge across channel connecting Malheur and Harney lakes, a few hundred feet west of Narrows, Harney County.

RECORDS AVAILABLE.—March 14, 1903, to July 21, 1906; March 22, 1911, to June 29, 1912; occasional readings in 1913, 1914, and 1916. Discontinued.

GAGE.—Vertical staff on highway bridge; datum at elevation 4,088.00 feet in 1903; 4,089.06 in 1912, 4,089.02 in 1913, and 4,088.86 feet in 1916, based on the latest elevation of 4,096.20 feet above sea level for iron post bench mark at east end of bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge; current very sluggish; conditions poor.

CHANNEL AND CONTROL.—Channel of mud overgrown with aquatic plants; no defined control; backwater may be caused by filling up of Mud Lake below.

EXTREMES OF STAGE.—1903–1916: Maximum stage recorded, 7.3 feet May 12 to 16, 1904 (discharge uncertain). Channel dry (bottom at elevation about 0.34 foot) September 16, 1911, to about April 15, 1912.

ICE.—No ice during period of records.

DIVERSIONS.—Flow past this point is only a small residue left from irrigation of thousands of acres and evaporation from surface of Malheur Lake.

ACCURACY.—Stage-discharge relation unstable, affected by growth of aquatic plants and backwater. Gage read only occasionally. Only a rough estimate of total run-off past this point can be made. (See footnote to table of discharge measurements.)

Discharge measurements of Malheur Lake outlet at Narrows, Oreg., during the year ending Sept. 30, 1916.

[Made by P. V. Hodges.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 25	4.21	66	May 22	5.20	142
May 1	4.68	183	June 7	5.40	187
14	5.00	203			

Gage readings and discharge of Malheur Lake outlet at Narrows, Oreg., in 1916.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 31	2.57	0	May 26	5.25	155
Apr. 6	2.57	0	June 13	5.35	175
May 6	4.90	200			

NOTE.—Total run-off estimated as follows: April, 1,550 acre-feet; May, 10,900 acre-feet; June, 8,690 acre-feet; July, 3,700 acre-feet; the period, 24,800 acre-feet.

MUD LAKE OUTLET NEAR NARROWS, OREG.

LOCATION.—In NW. ¼ sec. 17, T. 27 S., R. 30 E., about half a mile above gap in sand reef through which outlet enters Harney Lake, 4 miles southwest of Mud Lake, and 6 miles southwest of Narrows, Harney County.

RECORDS AVAILABLE.—May 10 to July 19, 1916.

GAGE.—Vertical staff on bent of bridge. Gage reader, John Rusek.

DISCHARGE MEASUREMENTS.—Made from footbridge; channel deep and narrow; current swift.

CHANNEL AND CONTROL.—Channel of mud and sand, scouring rapidly; no defined control.

EXTREMES OF DISCHARGE.—Maximum stage recorded during season, 2.00 feet May 25 (discharge, 112 second-feet); may have gone slightly higher. Stream bed dry up to May 9.

ICE.—No flow during ice period.

DIVERSIONS.—A little hay land is irrigated by natural overflow below the gage on Malheur Lake outlet; most of the loss is caused by evaporation on Mud Lake.

ACCURACY.—Stage-discharge relation unstable owing to erosion of the friable stream bed by the swift current. Fairly well defined rating curve used May 10 to 25; indirect method for shifting control, May 28 to 31; poorly defined rating curve, June 4 to July 19. Gage read to hundredths about twice a week, but fluctuation in stage very gradual. Daily discharge ascertained by applying gage height to rating table. Records fair.

Discharge measurements of Mud Lake outlet near Narrows, Oreg., during the year ending Sept. 30, 1916.

[Made by P. V. Hodges.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec-ft.*		*Feet.*	*Sec-ft.*
May 14	1.05	41.7	June 8	1.72	103
22	1.82	96	13	1.60	96

Daily discharge, in second-feet, of Mud Lake outlet near Narrows, Oreg., for the year ending Sept. 30, 1916.

Day.	May.	June	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1				11		102		21	96	61	
2			45	12			24	22	98		
3				13		95		23			
4		109		14	42	95		24	96		
5			40	15				25	112	55	
6				16			24	26			
7		109		17				27			
8		103		18		81		28	100	50	
9			32	19			18	29			
10	12			20				30			
								31	105		

NOTE.—Mean discharge estimated 12 second-feet July 20-31.

Monthly discharge of Mud Lake outlet near Narrows, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 10-31	112	12	74.8	3,260
June	109	50	82.8	4,930
July	45		23.7	1,460
The period				9,650

NOTE—Means in table computed from actual number of days for which discharge is given.

Extremes of discharge.—Maximum discharge during season, 272 second-feet at time of measurement April 21 (gage height, 2.30 feet); stage rose as discharge decreased. Practically no flow during fall and winter.

Ice.—No record.

Diversions.—Several thousand acres of land is watered from East Fork above the station, and some below it.

Regulation.—None.

Accuracy.—Stage-discharge relation affected by backwater from Malheur Lake and is no index of discharge. Daily discharge ascertained by taking percentages of discharge of West Fork. Coefficients were determined by interpolation between the percentages found on dates of measurements. Records poor.

Discharge measurements of East Fork of Silvies River near Lawen, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec-ft.*
Mar. 31	F. F. Henshaw	2.23	70	Apr. 25	P. V. Hodges	2.35	164
Apr. 7	do	2.24	108	May 13	do	2.45	58
21	P. V. Hodges	2.30	272	June 7	do	2.58	36

Daily discharge, in second-feet, of East Fork of Silvies River near Lawen, Oreg., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1	74	110	36	11	122	70	29	21	272	48	
2	78	110	36	12	132	62	29	22	229	48	
3	81	92	38	13	142	58	29	23	218	42	
4	85	92	31	14	164	55	29	24	192	38	
5	88	92	33	15	187	55	22	25	182	38	
6	100	92	35	16	200	55		26	160	38	
7	108	86	36	17	212	55		27	148	38	
8	113	78	29	18	225	55		28	139	40	
9	113	78	29	19	222	55		29	128	34	
10	122	70	29	20	246	55		30	110	34	
								31		36	

Monthly discharge of East Fork of Silvies River near Lawen, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April	272	74	153	9,100
May	110	34	61.6	3,790
June 1-15	38	22	31.3	931
The period				13,800

DONNER UND BLITZEN RIVER NEAR DIAMOND, OREG.

Location.—In SW. ¼ sec. 8, T. 32 S., R. 32½ E., at mouth of canyon, 1½ miles above "P" ranch buildings, about 25 miles southwest of Diamond, Harney County, and 40 miles above Narrows, Harney County.

Drainage area.—200 square miles (measured on special maps prepared by Garfield Stubblefield).

Records available.—May 22, 1910, to September 30, 1916; also January 26, 1909, to July 31, 1910, and November 1 to 12, 1910, at station below several diversion ditches.

Gage.—Vertical staff on left bank; zero of gage was raised 0.63 foot between 1913 and 1916, probably gradually. Gage reader, Jesus Achurra. Original gage was a vertical staff on right bank just below the wagon bridge near the ranch buildings.

Discharge measurements.—Made from cable 75 yards above gage or by wading.

Channel and control.—Bed composed of gravel and sand; one channel at all stages. Banks of stream covered with dense growth of willows and underbrush; subject to overflow at flood stages. Control of gravel; somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year, 6.0 feet at 7 a. m. March 12 (discharge, 1,820 second-feet); minimum stage recorded, 1.5 feet December 19, 26, January 2, 9, and 16 (discharge, 23 second-feet).

1909–1916: Maximum stage recorded, 6.4 feet at 7.30 p. m. May 3, 1915 (discharge, 2,060 second-feet); minimum stage recorded in 1916.

Ice.—Stage-discharge relation not affected by ice.

Diversions.—Present gage is above all irrigation ditches. Five ditches divert water from the stream above the old gage at ranch buildings.

Regulation.—None.

Accuracy.—Stage-discharge relation changed during high water of March; rating curve used up to March 12 fairly well defined below 1,000 second-feet by measurements made in 1915; curve used thereafter well defined between 35 and 1,000 second-feet. Gage read once a week to half-tenths until February 6; daily thereafter. Daily discharge ascertained by applying daily gage height to rating table. Records good except for February and March, for which they are fair.

Discharge measurements of Donner und Blitzen River near Diamond, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 3	A. H. Page[a]	1.58	32.1	May 24	P. V. Hodges	2.15	168
Apr. 10	Hodges and Henshaw	2.29	202	June 9	.....do	3.00	433

[a] Employee of Blitzen Valley Land Co.

Daily discharge, in second-feet, of Donner und Blitzen River near Diamond, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	......	......	......	81	65	260	218	308	204	76	67
2	......	......	......	23	107	50	246	232	308	232	76	58
3	33	......	......	......	133	42	232	232	308	218	76	58
4	......	......	......	......	159	42	178	246	325	191	76	58
5	......	......	29	......	185	42	165	260	342	178	76	58
6	......	......	......	......	210	42	165	260	360	165	76	58
7	......	29	......	......	65	50	165	246	378	165	76	58
8	......	......	......	......	50	75	165	232	378	165	76	58
9	......	......	......	23	29	85	204	218	435	152	76	58
10	29	......	......	......	35	95	275	218	395	152	76	58
11	......	......	......	......	35	288	232	204	378	152	76	58
12	......	......	29	......	35	1,820	218	204	395	140	76	58
13	......	......	......	......	35	1,460	204	191	395	128	76	58
14	......	29	......	......	35	1,010	178	191	395	128	76	58
15	......	......	......	......	35	690	178	178	415	106	76	58
16	......	......	......	23	35	515	178	178	435	117	76	58
17	29	......	......	......	35	395	178	178	435	117	76	58
18	......	......	......	......	35	395	178	178	415	106	76	58
19	......	......	23	......	35	435	152	260	395	96	76	58
20	......	......	......	......	35	395	128	246	360	96	76	58
21	......	29	......	......	45	395	106	204	232	96	76	58
22	......	......	......	......	55	360	140	178	204	86	76	58
23	......	......	......	29	65	360	140	178	191	86	76	58
24	29	......	......	......	75	342	152	165	178	86	76	58
25	......	......	......	......	85	325	152	191	165	86	76	58
26	......	......	23	......	85	325	152	870	152	86	76	58
27	......	......	......	......	75	325	165	690	152	86	76	58
28	......	29	......	......	65	325	165	600	140	86	76	58
29	......	......	......	......	65	308	178	535	128	76	76	58
30	......	......	......	29	......	308	178	455	128	76	76	58
31	29	......	......	......	......	232	......	325	......	76	76	......

Note.—Daily discharge interpolated Feb. 1–5, 21–24, and Sept. 17–23.

Monthly discharge of Donner und Blitzen River near Diamond, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	33	29	29. 8	1,830
November	29	29	29. 0	1,730
December	29	23	26. 0	1,600
January	29	23	25. 4	1,560
February	210	29	69. 6	4,000
March	1,820	42	374	23,000
April	275	106	180	10,700
May	870	165	283	17,400
June	435	128	308	18,300
July	232	76	127	7,810
August	76	76	76. 0	4,670
September	67	58	58. 3	3,470
The year	1,820	23	132	96,100

DONNER UND BLITZEN RIVER NEAR NARROWS, OREG.

Location.—In NE. ¼ sec. 26, T. 29 S., R. 31 E., at "grain camp" at bridge over movable diversion dam immediately below intake of Buena Vista canal, 2 or 3 miles above mouth of Keiger Creek, and about 25 miles south of Narrows, Harney County.

Drainage area.—Not measured.

Records available.—March 21 to July 31, 1915; April 7 to July 17, 1916.

Gage.—Vertical staff on west abutment of bridge. Gage reader, J. A. Miller.

Discharge measurements.—Made from cable about 70 feet below gage.

Channel and control.—Artificial channel excavated in clayey material; banks fairly even and not subject to overflow. No definite control.

Extremes of discharge.—Maximum stage recorded during year, 4.5 feet June 14 (discharge, 270 second-feet); minimum stage recorded, 1.25 feet May 4 (discharge, 16 second-feet).

Ice.—No records.

Diversions.—Buena Vista Canal and East Side ditch divert water from river just above gage; about 14,000 acres of the "P" ranch lands are irrigated by spring flooding from the river and its tributaries. (See p. 315 for records on Buena Vista Canal, and p. 326 for measurements of East Side ditch. Mean discharge for latter estimated as 6 seond-feet for 29 days in May; 6.7 second-feet for 7 days in June; and 5 second-feet for 5 days in July; total, 488 acre-feet.)

Regulation.—The diversion dam above the gage backs up the water 4 or 5 miles; the pondage thus created may affect materially the discharge of a day or two.

Accuracy.—Stage-discharge relation somewhat variable, especially at medium stages between 3 and 5 feet gage height; rating curve well defined. Gage read once daily to half-tenths. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Donner und Blitzen River near Narrows, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 10	Hodges and Henshaw	3. 28	126	May 23	P. V. Hodges	3. 80	180
May 2	P. V. Hodges	2. 22	50	June 10	do	3. 60	158
2	do	2. 90	92				

Daily discharge, in second-feet, of Donner und Blitzen River near Narrows, Oreg., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1		55	243	181	16	158	58	181	19
2		52	205	181	17	158	58	205	25
3		181	205	193	18	128	61	205	
4		16	193	193	19	119	128	205	
5		52	181	181	20	119	128	205	
6		52	169	181	21	119	193	205	
7	158	45	169	169	22	111	193	205	
8	158	103	158	169	23	119	181	181	
9	137	87	193	158	24	119	181	181	
10	137	80	147	50	25	119	181	181	
11	137	73	169	45	26	119	181	181	
12	147	67	158	22	27	119	181	169	
13	137	61	137	25	28	137	205	158	
14	137	61	270	22	29	128	230	158	
15	158	58	181	22	30	128	256	158	
					31		243		

Monthly discharge of Donner und Blitzen River near Narrows, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 7-30	158	111	134	6,380
May	256	16	119	7,320
June	270	137	185	11,000
July 1-17	193	19	108	3,640
The period				28,300

DONNER UND BLITZEN RIVER NEAR VOLTAGE, OREG.

Location.—In sec. 35, T. 26 S., R. 31 E., at bridge on road known as "Sod-house Lane," 2 miles west of Voltage post office, and 6 miles east of Narrows, Harney County.

Drainage area.—Not measured.

Records available.—April 6 to September 30, 1916.

Gage.—Vertical staff on downstream end of right abutment of bridge. Gage readers, R. J. Rimer and Harry Cole.

Discharge measurements.—Made from bridge across main channel and 16 culverts which carry water at high stages; measuring conditions poor.

Channel and Control.—Channel crooked and turns abruptly to right just below bridge; no defined control.

Extremes of discharge.—Maximum stage during year, 3.0 feet during March; observed from high-water marks (discharge estimated, 250 second-feet). Maximum discharge, 314 second-feet, including 120 second-feet flow through culverts (gage height, 2.47 feet) June 6. Minimum stage recorded, 0.85 foot September 28 (discharge, 43 second-feet).

Ice.—No record during ice period.

Diversions.—Several thousand acres irrigated from the river and its tributaries; discharge at station is largely return water.

Regulation.—Discharge considerbly influenced by diversion dams. Sudden rise of May 20 said to have been caused by breaking of dam.

Accuracy.—Stage-discharge relation for main channel variable and overflow is a function of gage height only in a general way. Gage read nearly every day to hundredths April 11 to July 20, and occasionally thereafter. Daily discharge ascertained by applying daily gage height to rating table. Records good for April and May; fair for other months.

Discharge measurements of Donner und Blitzen River near Voltage, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.		
			Main channel.	Over-flow.	Total.
		Feet.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*
Apr. 16	F. F. Henshaw	....	154	0	154
11	Hodges and Henshaw	1.68	121	0	121
21	P. V. Hodges	1.48	114	0	114
May 5	.....do	.80	67	22	89
22	.....do	2.25	131	76	207
June 7–8	.....do	2.40	160	121	281
12	.....do	2.35	155	77	232

Daily discharge, in second-feet, of Donner und Blitzen River near Voltage, Oreg., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	96	302	200	......	......	16	141	95	233	66	50	......
2	......	92	297	216	......	......	17	144	93	230	61	......	......
3	......	97	302	216	......	......	18	124	95	229	90	......	......
4	......	94	286	216	......	......	19	116	100	246	90	55	......
5	......	89	297	216	60	......	20	111	300	246	104	......	......
6	154	89	314	216	......	......	21	112	163	246	......	......	50
7	148	91	297	180	......	......	22	110	186	246	......	50	......
8	141	90	288	180	......	......	23	108	199	248	......	......	52
9	135	91	231	150	......	......	24	108	203	247	......	50	......
10	128	93	223	136	50	......	25	111	193	230	......	......	......
11	122	94	255	122	......	......	26	111	250	232	......	......	......
12	128	94	232	113	50	......	27	111	225	238	......	......	......
13	136	93	232	88	......	......	28	110	250	211	......	45	43
14	132	95	258	80	......	......	29	105	235	212	......	......	......
15	137	96	234	74	......	......	30	100	225	206	122	......	45
							31	......	302	......	96	......	......

NOTE.—Daily discharge ascertained from fairly well-defined rating curves applicable Apr. 11–27, May 1 to June 7 and June 8 to Sept. 30. Discharge of overflow channels estimated separately and added to that given by rating table for main channel June 8 to July 9. Daily discharge interpolated Apr. 7–10 and 28–30. Mean discharge estimated as 100 second-feet July 21–29.

Monthly discharge of Donner und Blitzen River near Voltage, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 6–30	154	100	123	6,100
May	302	89	145	8,920
June	314	206	252	15,000
July	216	61	127	7,810
August	....	45	[a] 51.2	3,150
September	....	....	[a] 47.5	2,830
The period	....	....	....	43,800

[a] Computed as mean for actual number of days for which discharge is given.

MUD CREEK NEAR DIAMOND, OREG.

LOCATION.—In NW. ¼ sec. 4, T. 32 S., R. 32½ E., a quarter of a mile east of ranch field, about 2 miles east of "P" ranch buildings, and about 23 miles southwest of Diamond, Harney County.

DRAINAGE AREA.—30 square miles (measured on special maps prepared by Garfield Stubblefield).

RECORDS AVAILABLE.—March 18, 1911, to September 30, 1916, when station was discontinued.

GAGE.—Vertical staff driven into bed of creek on left bank. Gage reader, Jesus Achurra.

DISCHARGE MEASUREMENTS.—Made from footbridge near gage, or by wading.

CHANNEL AND CONTROL.—Bed composed of clean sand; shifting. No defined control.

Extremes of discharge.—Maximum stage recorded during year, 4.5 feet May 26 (discharge, 100 second-feet); minimum discharge during year, 0.2 second-feet October 10, 17, and 24 (gage heght, 1.6 feet).

1911–1916: Maximum stage recorded, 5.65 feet at 6.30 p. m. May 3, 1915 (discharge, estimated from extension of rating curve, 154 second-feet); minimum stage recorded, 1.3 feet August 21 and 28, 1915 (discharge, 0.1 second-foot).

Ice.—Stage-discharge relation unaffected by ice.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Stage-discharge relation unstable. Three fairly well-defined rating curves used, October 1 to March 12, March 13 to May 25, and May 26 to September 30, respectively. Gage read weekly until January 30, daily after February 6, to half-tenths. Daily discharge ascertained by applying daily-gage height to rating table. Records fair.

Discharge measurements of Mud Creek near Diamond, Oreg., during the period Oct. 3, 1915 to Oct. 25, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Oct. 3	A. H. Page	1.66	0.26	May 3	P. V. Hodges	[a] 2.55	17.5
1916.				June 9	do	2.39	15.9
Apr. 10	Hodges and Henshaw	2.30	11.4	Oct. 25	Batchelder and Reineking	1.50	.34

[a] 2.58 feet after building rock control.

Daily discharge, in second-feet, of Mud Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1					2.5	1.3	8.0	13	18	8.0	0.9	0.3
2				0.2	3.6	1.3	8.0	15	18	8.0	.9	.3
3	0.3				4.7	1.3	8.0	19	18	8.0	.9	.3
4					5.8	1.3	7.0	19	18	6.0	.3	.3
5			0.2		6.9	1.3	7.0	19	18	5.2	.3	.3
6					8.0	1.3	7.0	20	18	4.5	.3	.3
7		0.2			3.0	2.0	9.0	20	18	4.5	.3	.3
8					.7	2.5	9.0	19	20	4.5	.3	.3
9				.2	.7	2.5	12	19	16	4.5	.3	.3
10	.2				.7	2.5	13	18	22	3.8	.3	.3
11					.7	3.0	12	17	21	3.0	.3	.3
12			.2		.7	30	12	16	21	3.0	.3	.3
13					1.3	32	12	15	20	3.0	.3	.3
14		.3			1.3	20	10	15	18	3.0	.3	.3
15					1.3	12	10	14	18	3.0	.3	.3
16				.2	1.3	12	10	14	18	3.0	.3	.3
17	.2				1.3	12	10	13	17	3.0	.3	.3
18					.7	12	10	13	16	3.0	.3	.3
19			.2		.7	12	10	18	15	2.2	.3	.3
20					1.3	12	8.0	17	15	2.2	.3	.3
21		.3			1.6	12	8.0	17	9.0	1.5	.3	.3
22					1.9	11	8.0	16	8.0	1.5	.3	.3
23				.3	2.3	10	8.0	16	6.0	1.5	.3	.3
24	.2				2.6	9.0	9.0	16	6.0	1.5	.3	.3
25					3.0	9.0	10	19	5.2	1.5	.3	.3
26			.2		3.0	8.0	11	100	4.5	1.5	.3	.3
27					2.0	8.0	11	75	4.5	1.5	.3	.3
28		.3			2.0	8.0	11	65	4.5	1.5	.3	.3
29					2.0	8.0	11	55	4.5	.9	.3	.3
30				.3		8.0	11	39	5.2	.9	.3	.3
31	.2					7.0		27		.9	.3	

Note.—Daily discharge interpolated Feb. 1–5, 21–24, and Sept. 17–23.

Monthly discharge of Mud Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0.3	0.2	0.22	14
November	.3	.2	.28	17
December	.2	.2	.20	12
January	.3	.2	.24	15
February	8.0	.7	2.33	134
March	32	1.3	8.78	540
April	13	7.0	9.67	575
May	100	13.0	25.1	1,540
June	22	4.5	14.0	833
July	8.0	.9	3.23	199
August	.9	.3	.36	22
September	.3	.3	.30	18
The year	100	.2	5.40	3,920

NOTE.—Means October to January computed from weekly observations.

BRIDGE CREEK NEAR DIAMOND, OREG.

LOCATION.—In SE. ¼ sec. 34, T. 31 S., R. 32½ E., a quarter of a mile east of ranch field, about 4 miles northeast of "P" ranch buildings, and about 20 miles southwest of Diamond, Harney County.

DRAINAGE AREA.—35 square miles (measured on U. S. Reclamation Service map).

RECORDS AVAILABLE.—March 18 to August 31, 1911, and January 1, 1912, to September 30, 1916, when station was discontinued.

GAGE.—Vertical staff on left bank. Gage reader, Jesus Achurra.

DISCHARGE MEASUREMENTS.—Made from footbridge near gage.

CHANNEL AND CONTROL.—Bed composed of alluvium and clay; shifts slightly. One channel; banks not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.8 feet May 26 (discharge, 163 second-feet); minimum stage recorded, 1.55 feet October 3 to January 30 and February 9 to 20 (discharge, 7.5 second-feet).

1911–1916: Maximum stage recorded, 4.85 feet May 3, 1915 (discharge, 166 second-feet); minimum discharge, 7 second-feet (gage height, 1.85 feet) February 24 and 25, 1912.

ICE.—Stage-discharge relation unaffected by ice on account of large volume of flow from springs.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent; rating curve fairly well defined; modified slightly below 25 second-feet to average measurements of 1915 and 1916. Gage read to half-tenths weekly until February 6; daily thereafter. Daily discharge ascertained by applying daily gage height to rating table. Records good.

Discharge measurements of Bridge Creek near Diamond, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 10	Hodges and Henshaw	1.83	18.0	June 9	P. V. Hodges	1.90	20.0
May 3	P. V. Hodges	1.92	19.2	Oct. 15	Batchelder and Reineking	1.70	10.7
24	do	1.90	16.2				

Daily discharge, in second-feet, of Bridge Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	......	......	7.5	20	9	12	18	29	16	12	12
2	......	......	......	......	26	9	12	18	27	16	12	12
3	7.5	......	......	......	32	9	12	18	25	15	12	12
4	......	......	......	......	38	9	10	18	25	15	12	12
5	......	......	7.5	......	44	9	10	18	23	15	12	12
6	......	......	......	......	50	9	10	20	23	15	12	12
7	......	7.5	......	......	37	9	10	21	23	15	12	12
8	......	......	......	......	10	10	10	20	23	15	12	12
9	......	......	......	7.5	7.5	10	16	18	18	15	12	12
10	7.5	......	......	......	7.5	18	18	18	21	14	12	12
11	......	......	......	......	7.5	25	16	16	21	14	12	12
12	......	......	7.5	......	7.5	48	16	16	21	14	12	12
13	......	......	......	......	7.5	45	16	16	18	14	12	12
14	......	7.5	......	......	7.5	29	15	16	16	14	12	12
15	......	......	......	......	7.5	23	15	16	15	14	12	12
16	......	......	......	7.5	7.5	23	15	16	15	14	12	12
17	7.5	......	......	......	7.5	21	15	16	15	14	12	12
18	......	......	......	......	7.5	15	15	16	15	14	12	12
19	......	......	7.5	......	7.5	21	15	31	15	14	12	12
20	......	......	......	......	7.5	20	14	25	15	14	12	12
21	......	7.5	......	......	8.0	18	14	18	15	14	12	12
22	......	......	......	......	8.5	16	15	16	15	14	12	12
23	......	......	......	7.5	9.0	16	15	16	15	14	12	12
24	7.5	......	......	......	9.5	15	16	16	15	14	12	12
25	......	......	......	......	10	15	16	31	15	14	12	12
26	......	......	7.5	......	10	14	16	163	15	14	12	12
27	......	......	......	......	9.0	14	16	95	15	14	12	12
28	......	7.5	......	......	9.0	12	16	65	15	14	12	12
29	......	......	......	......	9.0	12	16	58	15	12	12	12
30	......	......	......	7.5	......	12	16	45	15	12	12	12
31	7.5	......	......	......	......	12	......	31	......	12	12	......

NOTE.—Daily discharge interpolated Feb. 1–5, 21–24, Mar. 6 and 10, and Sept. 17–23.

Monthly discharge of Bridge Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	7.5	7.5	7.50	461
November	7.5	7.5	7.50	446
December	7.5	7.5	7.50	461
January	7.5	7.5	7.50	461
February	50	7.5	14.8	851
March	48	9.0	17.0	1,050
April	18	10	14.3	851
May	163	16	29.8	1,830
June	29	15	18.4	1,090
July	16	12	14.2	873
August	12	12	12.0	738
September	12	12	12.0	714
The year	163	7.5	13.5	9,830

NOTE.—Means for October to January determined from weekly computations of discharge.

KEIGER CREEK NEAR DIAMOND, OREG.

LOCATION.—In NW. ¼ sec. 10, T. 30 S., R. 33 E., about 100 yards above point where creek forks, about 2½ miles southeast of Diamond, Harney County.

DRAINAGE AREA.—75 square miles.

RECORDS AVAILABLE.—January 26, 1909, to May 31, 1910; May 14 to Aug. 31, 1911; February 14, 1912, to September 5, 1913; October 5 to 27, 1915; April 11 to September 2, 1916.

GAGE.—Vertical staff on left bank; gage used 1909 and 1910 at different site and datum. Gage reader, Prim Ortega.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Gravel; somewhat shifting. Banks brush-covered; not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 3.4 feet, June 10 (discharge, 163 second-feet). Minimum discharge recorded, 4.3 second-feet (gage height, 1.25 feet, ice-affected), December 29.

1909–1910, 1912–1913, and 1915–1916: Maximum stage recorded, 4.7 feet, May 19, 1912 (discharge, 330 second-feet). A higher flood may have occurred while records were suspended. Minimum discharge, 4.3 second-feet, December 29, 1915.

Ice.—Stage-discharge relation somewhat affected by ice during extremely cold weather.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Stage-discharge relation fairly permanent; rating curve fairly well defined. Gage read to half-tenths daily with occasional breaks. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

Discharge measurements of Keiger Creek near Diamond, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	A. H. Page	1.08	6.6	May 5	P. V. Hodges	3.15	130
Dec. 29	do	[a] 1.25	4.3	June 11	do	2.90	126
Apr. 11	Hodges and Henshaw	2.46	82				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Keiger Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1			66	86		16	8
2			86	70		16	8
3			86	70		16	
4			118	90		16	
5	6.6		145	110	52	16	
6	7		145	118	49	14	
7	7		118	110	78	14	
8	7		98	127	94	14	
9	7		90	127	110	14	
10			86	163	110	14	
11	7	82	102	127	56	12	
12	7	78	86	94	56	12	
13	8	63	52	94	49	14	
14	8	49	50	86	46	12	
15	8	49	49	94	43	12	
16	8	49	49	98	37	12	
17	8	49	63	98	49	12	
18	8	49	86	94	49	12	
19	8	49	110	89	37	12	
20	8	49	70	83	31	21	
21	8	55	63	78	31	21	
22	8	61	52	56	26	16	
23	8	66	49	49	26	16	
24	8	72	84	49	24	12	
25	8	78	118	52	21	12	
26	8	78	145	56	21	12	
27	8	90	102		21	10	
28		90	102		21	10	
29		74	102		21	9	
30		70	102		21	9	
31			98		21	9	

Note.—Mean discharge estimated at 50 second-feet June 27–30; 70 second-feet July 1–4. Daily discharge interpolated Apr. 21–24, 30, May 14, 18, 24, 28, June 4, 19, 20, and 25.

Monthly discharge of Keiger Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 11-30	90	49	65.0	2,580
May	145	49	89.4	5,500
June	163		85.6	5,090
July	110	21	47.7	2,930
August	21	9	13.5	830
The period				16,900

CUCAMONGA CREEK NEAR DIAMOND, OREG.

Location.—In NE. ¼ sec. 7, T. 30 S., R. 33 E., about a mile above old Cummings place, 2½ miles southwest of Diamond, Harney County.

Drainage area.—15 square miles.

Records available.—March 14, 1911, to September 30, 1913 (fragmentary); April 11 to September 2, 1916.

Gage.—Inclined staff on left bank. Vertical staff up to June 11, 1916. Gage reader, Prim Ortega.

Discharge measurements.—Made by wading.

Channel and control.—Sand; shifting; no defined control.

Extremes of discharge.—Maximum stage recorded during year and during period of records, 3.7 feet, May 25 (discharge, 77 second-feet). Creek dry beginning September 2.

Ice.—No record during winter.

Diversions.—None.

Regulation.—None.

Accuracy.—Stage-discharge relation fairly permanent. Rating curve poorly defined. Gage read to half-tenths once a day with breaks. Daily discharge ascertained by applying daily gage height to rating table. Records poor.

Discharge measurements of Cucamonga Creek near Diamond, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 11	Hodges and Henshaw	2.06	14.6
May 5	P. V. Hodges	1.65	7.5
Oct. 26	Batchelder and Reineking	.52	.5

Daily discharge, in second-feet, of Cucamonga Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1		4.5	10		0.7	0.1	16	10	5	5	2.2	.7	
2		3.3	9		.7	0.0	17	7	4.5	6	2.7	1.0	
3		3.3	8		.7		18	7	4	6	2.2	.7	
4		6.0	8		.7		19	7	34	6	2.2	.7	
5		7.5	8	4	.7		20	6	11	7	1.8	.5	
6		8	8	4	.7		21	4	8	7	1.8	.5	
7		8	8	6	.7		22	6	7	6	1.8	.3	
8		10	8	7	.7		23	7	6	4	1.4	.3	
9		10	8	7	.7		24	8	10	2.7	1.4	.2	
10		8	9	5	.7		25	10	77	3	1.4	.2	
11	14	8	8	4	.7		26	10	11	3.3	1.0	.2	
12	10	6	7.5	4	.6		27	10	22		.8	.15	
13	10	6	6	3.6	.7		28	10	16		.7	.15	
14	10	6	6	3.3	.7		29	8	11		.7	.2	
15	10	5	6	2.7	.7		30	6	10		1.0	.2	
							31		11		.8	.15	

Note.—Mean discharge estimated as 4 second-feet May 18; 10 second-feet May 24; 3 second-feet June 27-30, and 5 second-feet July 1-4. Daily discharge interpolated Apr. 22-24, 30; May 14, 18, 28; June 4, 19, 20, and 25.

Monthly discharge of Cucamonga Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 11-30	14	4	8.5	337
May	77	3.3	11.2	689
June	10	2.7	6.18	368
July	....	.7	3.05	188
August	1.0	.15	.53	33
The period	....	....	....	1,620

McCOY CREEK NEAR DIAMOND, OREG.

LOCATION.—In sec. 12, T. 30 S., R. 32 E., about 1,000 feet above Kesterson's ranch house, and about 5 miles southwest of Diamond, Harney County.

DRAINAGE AREA.—45 square miles (measured on special maps prepared by Garfield Stubblefield).

RECORDS AVAILABLE.—May 23, 1910, to September 30, 1914; October 5 to 27, 1915; April 11 to September 2, 1916; also January 27 to June 30, 1909, on original gage, which was below some diversions.

GAGE.—Vertical staff on right bank, installed August 7, 1913, 250 feet below that installed May 23, 1910. The original gage was 2½ miles farther downstream and 3 miles from Diamond post office. Gage reader, Prim Ortega.

DISCHARGE MEASUREMENTS.—Made from a foot bridge 100 yards above present gage or by wading.

CHANNEL AND CONTROL.—Channel of clean gravel and sand; likely to shift. Control is a rock diversion dam at intake of Kesterson's ditch, which changes slightly in flood.

EXTREMES OF DISCHARGE.—Maximum stage during year (observed June 10 from high-water marks), 4.0 feet, during night of June 5–6 (discharge, 190 second-feet); minimum stage recorded, 1.15 feet, October 6 to 12 (discharge, 2 second-feet).

1910–1916: Maximum stage recorded, 6.6, feet, during night of June 7, 1912 (discharge estimated from extension of rating curve as 300 second-feet); minimum discharge, 1.0 second-foot, September 1 to 4, 1911 (gage height, 1.6 feet), and July 26 to August 1, 1914 (gage height, 1.10 feet).

ICE.—No record during winter.

DIVERSIONS.—Above all diversions except one unimportant ditch.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during high water of June. Well-defined rating curves used up to June 5 and beginning with June 21. Gage read to half-tenths once a day with occasional gaps. Daily discharge ascertained by applying daily gage height to rating table. Shifting control method used June 6 to 20. Records good.

Discharge measurements of McCoy Creek near Diamond, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	A. H. Page	1.17	2.6	May 5	P. V. Hodges	3.02	102
Dec. 29	....do	[a] 1.37	2.8	24	....do	2.20	48.5
Apr. 11	Hodges and Henshaw	2.14	43	June 10	....do	3.30	120
May 4	P. V. Hodges	2.73	82				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of McCoy Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	....	....	66	....	8.5	2.0
2	....	....	....	54	....	7.0	2.0
3	....	....	....	70	....	7.0	....
4	....	....	84	86	....	7.0	....
5	2.4	....	101	101	74	7.0	....
6	2.0	....	117	129	53	7.0	....
7	2.0	....	87	90	74	7.0	....
8	2.0	....	87	129	81	7.0	....
9	2.0	....	80	138	92	7.0	....
10	....	....	66	124	74	7.0	....
11	2.0	45	73	111	60	5.0	....
12	2.0	36	60	98	60	5.0	....
13	3.0	36	45	101	47	17.0	....
14	3.0	26	73	101	47	7.0	....
15	3.0	36	101	109	53	7.0	....
16	3.0	26	57	113	47	7.0	....
17	3.0	26	66	121	47	7.0	....
18	3.0	26	76	113	34	6.0	....
19	3.0	26	87	88	26	5.0	....
20	3.0	26	80	63	21	7.0	....
21	3.0	28	66	38	21	5.0	....
22	3.0	30	57	56	17	5.0	....
23	3.0	32	51	60	17	5.0	....
24	3.0	34	48	70	13	5.0	....
25	3.0	36	66	68	13	4.0	....
26	3.0	36	60	67	13	3.0	....
27	3.0	....	57	....	12	2.5	....
28	....	....	65	....	10	2.5	....
29	....	....	73	....	10	3.0	....
30	....	....	80	....	10	3.0	....
31	....	....	73	....	8.5	2.0	....

NOTE.—Mean discharge estimated at 30 second-feet Apr. 27–30; 50 second-feet May 1–3; 60 second-feet June 27–30; 80 second-feet July 1–4.

Monthly discharge of McCoy Creek near Diamond, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 11–30	45	26	31.2	1,240
May	117	45	70.5	4,330
June	138	38	86.8	5,160
July	92	8.5	43.7	2,690
August	17	2.0	5.95	366
The period	....	....	....	13,800

BUENA VISTA CANAL NEAR NARROWS, OREG.

LOCATION.—In NE. ¼ sec. 26, T. 29 S., R. 31 E., at bridge over canal 300 feet below intake, opposite station on Donner und Blitzen River at "grain camp," about 25 miles south of Narrows, Harney County.

RECORDS AVAILABLE.—March 25 to June 7, 1915; April 7 to July 19, 1916.

GAGE.—Vertical staff on pier of bridge. Gage reader, J. A. Miller.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Canal is about 4 feet deep, excavated in a clayey material. A dam across canal about 1½ miles below gage causes backwater at times.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.1 feet June 9 (discharge, 148 second-feet). Canal dry at times.

1915–1916: Maximum stage recorded, 4.6 feet May 14, 1915 (discharge, 179 second-feet).

Ice.—Water turned out of canal during extremely cold weather.

Accuracy.—Stage-discharge relation fairly permanent up to May 25; well defined rating curve used except May 23 to 25, when discharge was estimated. May 26 the dam, 1½ miles below, was put in to back water out over fields; discharge estimated up to June 8 and from June 14 to 30. Dam out June 9 to 13, and is assumed to have been out during July; open-water rating curve applied. Records good for April and May; fair for June and July.

This canal diverts water from left bank of Donner und Blitzen River, in the NE. ¼ sec. 26, T. 29 S., R. 31 E., to irrigate marsh hay lands on west side of Donner und Blitzen River.

Discharge measurements of Buena Vista canal near Narrows, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 10	Hodges and Henshaw	2.85	56	May 23	P. V. Hodges	2.52	29.2
May 2	P. V. Hodges	3.26	85	June 10	do	3.65	113
4	do	3.75	118				

Daily discharge, in second-feet, of Buena Vista canal near Narrows, Oreg., for the year ending Sept. 30, 1916.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1		100		7	16	18	72		54
2		90		54	17	13	72		54
3		0		93	18	43	72		15
4		120		54	19	43	116		15
5		116		43	20	18	116		
6		116		29	21	13	60		
7	15	100		11	22	13	54		
8	40	108		0	23	29	23		
9	69	108	148	0	24	29	21		
10	57	100	116	72	25	18	21		
11	66	100	108	72	26	43			
12	66	96	108	79	27	48			
13	66	79	108	79	28	57			
14	60	79		79	29	54			
15	48	79		79	30	51			

Note.—Daily discharge estimated Apr. 7-8. Mean discharge estimated as 20 second-feet May 26-31, 10 second-feet June 1-8, and 5 second-feet June 14-30. These estimates very uncertain; discharge may have varied from zero to that given by open-channel rating. Canal dry prior to Apr. 7, on May 3, and July 8 and 9; no record after July 19; water probably turned out about that date.

Monthly discharge of Buena Vista canal near Narrows, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 7-30	69	13	40.7	1,940
May (30 days)	120		71.3	4,240
June	148		25.1	1,490
July 1-19 (17 days)	93	7	52.3	1,760
The period				9,430

SILVER CREEK ABOVE RILEY, OREG.

LOCATION.—In NW ¼ sec. 30, T. 22 S., R. 26 E., at Cecil ranch, 3 miles below Nicholas Creek and about 12 miles above Riley, Harney County.

DRAINAGE AREA.—260 square miles (measured on United States Reclamation Service maps).

RECORDS AVAILABLE.—April 19, 1904, to July 14, 1906; February 16 to December 12, 1909; April 6 to October 19, 1910; flood periods of 1911, 1912, and 1914–1916.

GAGE.—Vertical and inclined staffs on right bank, one-fourth mile above Cecil ranch house and 100 yards above point where creek divides into three channels. Gage reader, J. C. Cecil. Stevens water-stage recorder, installed temporarily, used April 8 to 22. Different gages used 1904 to 1906 and 1909 to 1910.

DISCHARGE MEASUREMENTS.—Made by wading or from cable about 100 yards below the gage.

CHANNEL AND CONTROL.—Bed composed of clean gravel; slightly shifting; banks heavily covered with willows, which may affect stage-discharge relation somewhat.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.2 feet, at 8 a. m. March 19 (discharge, 698 second-feet). No record of minimum, which is very small.

1904–1906 and 1909–1916: Maximum stage recorded, 13.95 feet on original gage, observed from high-water mark April 14, 1904 (discharge, 1,760 second-feet). Stream bed dry in August and September, 1910.

ICE.—Stage-discharge relation affected by ice; no record during winter.

DIVERSIONS.—Practically no land irrigated above station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read once daily to tenths and extremely high-water marks during night noted. Operation of recorder satisfactory until April 22, when float stuck in mud. Daily discharge ascertained by applying to rating table the daily gage height or the mean of the reading and the recorded peak. Records good for period for which gage record is available; estimate for yearly total fair.

Discharge measurements of Silver Creek above Riley, Oreg., during the year ended Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Mar. 19	R. D. Cooper	6.40	586
Apr. 8	P. V. Hodges	4.62	351
May 12	.....do	1.37	43.7

Daily discharge, in second-feet, of Silver Creek above Riley, Oreg., for the year ending Sept. 30, 1916.

Day.	Mar.	Apr.	Day.	Mar.	Apr.	Day.	Mar.	Apr.
1		348	11	275	491	21	546	180
2		400	12	170	426	22	465	170
3		450	13	335	335	23	323	
4		430	14	299	299	24	281	
5		413	15	275	287	25	258	
6		361	16	323	253	26	244	
7		335	17	413	231	27	230	
8		348	18	491	220	28	217	
9		348	19	698	210	29	203	
10		387	20	628	190	30	190	
						31	269	

NOTE.—Discharge interpolated Mar. 21, 26–29, and 31; estimated Apr. 2–4. Mean discharge Apr. 23 to 30, estimated 150 second-feet.

Monthly discharge of Silver Creek above Riley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 11-31	698	170	340	14,200
April	491		277	16,500
May			a 53	3,260
The period				34,000

a Estimated.

NOTE.—Total run-off for year about 36,000 acre-feet.

CATLOW VALLEY DRAINAGE BASIN.

HOME CREEK NEAR BECKLEY, OREG.

LOCATION.—In NE. ¼ sec. 10, T. 35 S., R. 32 E., at mouth of canyon, half a mile above Home Creek ranch buildings, 12 miles southeast of Beckley, and about 60 miles south of Narrows, Harney County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 21 to July 31, 1911; February 10 to July 31, 1912; April 1, 1915, to September 30, 1916.

GAGE.—Vertical staff on left bank; gage reader, Roy Haskin. A similar staff at practically the same site but different datum was used in 1911 and 1912.

DISCHARGE MEASUREMENTS.—Made from foot plank near gage or by wading. Conditions poor.

CHANNEL AND CONTROL.—Bed composed of heavy gravel and boulders; may shift in extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.4 feet May 25 (discharge, 104 second-feet); minimum stage recorded, 1.5 feet September 8, 9, and 16 (discharge, 0.1 second-foot; very uncertain; discharge seldom less than 1 second-foot).

1911–12 and 1915–16: Maximum stage recorded, 4.7 feet on old gage, April 27, 1912 (discharge, 330 second-feet); minimum is that of 1916.

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—None above station; most of the water of the creek is used for flood irrigation on the hay lands of the Home Creek ranch.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during or after high water of 1915. New curve, fairly well defined by measurements made from November, 1915, to October, 1917, used beginning October 1. Gage read daily to half-tenths May 1 to September 10 and about three times a week rest of year, except April. Daily discharge ascertained by applying daily gage height to rating table. Records fair.

Discharge measurements of Home Creek near Beckley, Oreg., during the year ending Sept. 30, 1916.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 17	A. H. Page	1.84	1.5
17	do	1.84	1.7
May 3	P. V. Hodges	2.45	21.8

Daily discharge, in second-feet, of Home Creek near Beckley, Oreg., for the year ending Sept. 30, 1916.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	May.	June.	July.	Aug.	Sept.
1	......	2.0	......	3	7	14	4	23	10	1.2	1.2
2	......	......	......	......	......	......	4	16	8	1.2	1.2
3	1.6	2.0	18	3	......	23	20	16	6	1.2	1.0
4	1.4	......	......	......	12	......	7	16	6	1.2	1.0
5	......	3.0	4	4	12	......	8	14	6	1.2	1.0
6	3.0	2.4	......	......	......	23	6	14	4	1.2	1.0
7	2.4	4.0	4	4	11	......	14	12	4	1.2	.9
8	2.4	......	......	......	......	20	14	12	4	1.2	.1
9	2.0	2.0	3	6	......	......	19	12	4	1.2	.1
10	1.2	......	......	......	11	29	18	12	3	1.2	.2
11	......	2.4	3	6	......	......	30	10	3	1.2	......
12	1.6	3.0	......	......	12	......	36	8	3	1.2	1.0
13	......	......	4	6	......	36	40	8	3	1.2	......
14	1.6	4.0	......	......	12	......	44	8	3	1.2	1.0
15	......	......	4	......	......	40	52	7	2	1.2	......
16	1.6	3.0	......	6	......	38	61	8	2	1.2	.1
17	......	1.5	4	......	18	......	52	8	3	2.0	......
18	1.2	......	......	7	......	40	56	8	3	2.0	1.0
19	......	7	3	......	23	23	61	10	3	2.0	1.0
20	1.2	......	......	7	20	......	71	7	3	3.0	.7
21	......	4	......	......	23	23	61	7	2	1.6	1.0
22	1.6	......	3	7	......	20	61	7	2	1.6	.3
23	2.0	......	......	......	......	......	56	7	2	1.6	.5
24	......	......	......	7	14	26	82	7	1.6	1.2	1.0
25	2.0	......	2	......	......	......	104	7	1.6	1.2	......
26	......	44	......	7	14	......	66	7	1.6	1.2	1.0
27	2.0	......	4	......	......	23	36	7	1.6	1.2	.7
28	......	......	......	......	20	29	29	7	1.6	1.2	......
29	2.4	......	3	7	......	......	20	7	1.6	1.2	1.0
30	......	10	......	......	......	26	18	8	1.2	1.0	......
31	......	44	......	......	......	......	18	......	1.2	1.0	......

NOTE.—No evidence that stage-discharge relation was affected by ice; open-channel rating applied throughout the winter. Rise Nov. 26 to Dec. 3 evidently caused by rain. Records for January and February may be slightly too large.

Monthly discharge of Home Creek near Beckley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	3.0	1.2	1.8	111
November	44	1.5	8.6	512
December	18	2.0	4.5	277
January	7	3	5.7	350
February	23	7	15.0	863
March	40	14	27.1	1,670
April	....	....	a 15.0	893
May	104	4	37.7	2,320
June	23	7	10.0	595
July	10	1.2	3.3	203
August	3	1.0	1.4	86
September	1.2	.1	.8	48
The year	104	0.1	10.9	7,930

a Estimated.

NOTE—Means for October to March and September determined from actual number of days for which discharge is given.

MISCELLANEOUS DISCHARGE MEASUREMENTS.

Discharge measurements of streams in the Great Basin at points other than regular gaging stations, made during the year ending September 30, 1916, are listed in the following table; also some measurements of canals in the Sevier Lake basin made during the year ending September 30, 1915.

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916				*Feet.*	*Sec.-ft.*
Apr. 16	Soda Springs Power canal.	Soda Creek	Soda Springs, Idaho		35.9
Sept. 16	Logan River	Bear River	About 100 feet below Utah Power & Light Co.'s tailrace and 200 feet below gaging station on Logan River above State dam.	[a] 0.97	164
17	do	do	do	.96	156
18	do	do	do	.98	157
19	do	do	do	.99	160
20	do	do	do	.98	158
21	do	do	do	.98	157
22	do	do	do	.97	154
26	do	do	do	.97	151
28	do	do	do	.98	154
8	do	do	150 feet below State dam; 2 miles east of Logan, Cache County, Utah; gage height from gage 100 feet downstream at former gaging station, Logan River below State dam.	1.36	161
9	do	do	do	1.35	160
10	do	do	do	1.36	162
10	do	do	do	1.36	161
11	do	do	do	1.36	165
12	do	do	do	1.35	161
12	do	do	do	1.34	157
13	do	do	do	1.34	156
16	do	do	do	1.35	159
17	do	do	do	1.34	160
18	do	do	do	1.34	156
19	do	do	do	1.34	154
20	do	do	do	1.33	154
21	do	do	do	1.31	150
22	do	do	do	1.31	151
29	do	do	do	1.26	144
June 25	Thaynes Canyon	East Canyon Creek	Sec. 8, T. 2 S., R. 4 E., Salt Lake meridian; above Sullivan's ranch; 1½ miles northwest of Park City, Summit County, Utah.		.8
25	do	do	Above Sullivan's springs		.4
25	do	do	Below Sullivan's springs		9.4
25	Hidden spring	Thaynes Canyon	About ¼ mile above Sullivan's ranch.		.3
25	Snyder's spring	do	About 1½ miles northwest of Park City, Utah.		.6
25	Hauter spring	do	Sec. 9, T. 2 S., R. 4 E., about ½ mile north of Park City, Utah.		12
1915 Dec. 4	Middle Fork of Ogden River.	Ogden River	Sec. 11, T. 6 N., R. 1 E., Salt Lake meridian, at highway bridge 1½ miles west of Huntsville, Weber County, Utah.		25
4	South Fork of Ogden River.	do	Sec. 14, T. 6 N., R. 1 E., 1½ miles west of Huntsville, Utah, and ½ mile above junction of Middle and South Forks.		22
4	North Fork of Ogden River.	do	Sec. 10, T. 6 N., R. 1 E., 400 feet above road and 2 miles west of Huntsville, Utah.		10
Nov. 6	Jordan River	Great Salt Lake	Sec. 35, T. 4 S., R. 1 W. Salt Lake meridian, at the impounding dam just above Jordan narrows, about 5 miles northwest of Lehi, Utah County, Utah.		159

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[a] Temporary gage installed for this set of measurements.

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916—Continued.

Sevier Lake basin.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1916. June 28	Sevier River	Sevier Lake	SE. ¼ sec. 28, T. 34 S., R. 5 W., below heading of East Panguitch canal, about a mile east of Panguitch, Utah.		102
Sept. 12	do	do	do		61
June 28	do	do	NW. ¼ sec. 9, T. 34 S., R. 5 W., below heading of old Houston canal, about 3½ miles NE. of Panguitch, Utah.		102
July 11	do	do	do		68
Aug. 9	do	do	do	4.30	274
18	do	do	do	4.03	187
Sept. 12	do	do	do	3.64	86
Aug. 15	do	do	NE. ¼ sec. 33, T. 24 S., R. 3 W., 200 feet below heading of Annabella canal, about a mile southeast of Elsinore, Utah.		27
Jan. 22	do	do	NW. ¼ sec. 32, T. 23 S., R. 2 W., 200 feet below heading of Vermilion canal, about 2½ miles east of Richfield, Utah.		48
22	do	do	NW. ¼ sec. 31, T. 22 S., R. 1 W., above backwater of Rockyford reservoir, about ¾ mile east of Sigurd, Utah.		152
Aug. 14	do	do	do		210
Feb. 17	do	do	NE. ¼ sec. 22, T. 16 S., R. 2 W., ⅛ mile above upper Mollen Spring, 3 miles NW. of Sevier Bridge dam, 6½ miles south of Mills, Utah.		7.8
17	do	do	SW. ¼ sec. 11, T. 16 S., R. 2 W., ¼ mile below lower Mollen Spring, about 4½ miles NW. of Sevier Bridge dam and 5 miles south of Mills, Utah.		39
16	do	do	NW. ¼ sec. 23, T. 15 S., R. 2 W., about 200 feet below railroad bridge near Mills, Utah.		54
1915. Oct. 6	South Fork Mammoth Creek.	Mammoth Creek	SE. ¼ sec. 27, T. 36 S., R. 8 W., about 7 miles southwest of Blue Spring Fish Hatchery and 30 miles southwest of Panguitch, Utah.	.10	.6
1916. Aug. 19	do	do	do	.35	2.8
1915. Oct. 7	Mammoth Creek	Sevier River	SE. ¼ sec. 26, T. 36 S., R. 8 W., about 3 miles south of Blue Spring Fish Hatchery, ½ mile below junction of Castle Creek and South Fork of Mammoth Creek, and 30 miles southwest of Panguitch, Utah.	.83	4.8
Dec. 9	do	do	do	.78	3.1
1916. Feb. 26	do	do	do	.72	3.0
Apr. 2	do	do	do	.80	3.7
Aug. 19	do	do	do	.88	6.1
1915. Dec. 9	do	do	NE. ¼ sec. 36, T. 36 S., R. 8 W., about 3 miles southeast of Blue Spring, 1 mile below junction of Castle Creek and South Fork of Mammoth Creek, and 30 miles southwest of Panguitch, Utah.		3.2
1916. June 1	Barnhurst ditch	Mammoth Creek	SW. ¼ sec. 31, T. 36 S., R. 5 W., about 1 mile west of Hatchtown dam, 2½ miles southwest of Hatch, Utah.		7.9
1	do	do	do		6.5
July 11	East Bench canal	Long canal	W. ½ sec. 2, T. 35 S., R. 5 W., 100 feet below Long canal gaging station and 3½ miles southeast of Panguitch, Utah.	.64	7.1

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916—Continued.

Sevier Lake basin—Continued.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1916. Aug. 19	Panguitch Lake Feeder canal.	Blue Spring Creek..	SE. ¼ sec. 14, T. 36 S., R. 8 W., about 1 mile below heading, 5 miles southwest of Blue Springs, and 28 miles southwest of Panguitch, Utah.	0.84	3.3
1915. Dec. 10	Blue Spring........	.....do..............	Near center of sec. 7, T. 36 S., R. 7 W., at Blue Spring Fish Hatchery, 23 miles southwest of Panguitch, Utah.	....	4.2
8	Panguitch Creek.....	Sevier River........	NE. ¼ sec. 34, T. 35 S., R. 7 W., about 100 yards below Panguitch Lake dam and about 15 miles southwest of Panguitch, Utah.	....	0.1
1916 Aug. 19	.....do............	.....do..............	.....do....................	.53	23.0
May 20	Vaeter canal.........	.....do..............	SW. ¼ sec. 10, T. 33 S., R. 5 W., at head near Panguitch, Utah.	.36	1.5
29	.....do............	.....do..............	.....do....................	.49	1.7
June 15	.....do............	.....do..............	.....do....................	.70	4.6
July 1	.....do............	.....do..............	.....do....................	.70	5.7
14	.....do............	.....do..............	.....do....................	.58	3.7
27	.....do............	.....do..............	.....do....................	1.38	11.3
Aug. 11	.....do............	.....do..............	.....do....................	.90	8.3
25	.....do............	.....do..............	.....do....................	.86	6.7
1916. May 10	.....do............	.....do..............	.....do....................	.98	7.8
June 2	.....do............	.....do..............	.....do....................	1.02	9.2
28	.....do............	.....do..............	.....do....................	.83	8.8
July 11	.....do............	.....do..............	.....do....................	.60	6.9
31	.....do............	.....do..............	.....do....................	1.38	11.0
1915 Dec. 6	Otter Creek reservoir feeder canal.	East Fork Sevier River.	NW. ¼ sec. 15, T. 31 S., R. 2 W., near head of canal, ½ mile southwest of Coyoto schoolhouse.	....	48
6	East Fork Sevier River.	Sevier River........	NW. ¼ sec. 15, T. 31 S., R. 2 W., about 300 yds. below canal heading, and ½ mile southwest of Coyoto schoolhouse.	....	4.5
6	Otter Creek reservoir seepage ditch.	East Fork Sevier River.	NW. ¼ sec. 28, T. 30 S., R. 2 W., about 200 feet above Otter Creek reservoir outlet, and 12 miles east of Kingston Utah.	....	5.1
1916 Jan. 2	.....do............	.....do..............	.....do....................	....	6.4
July 1	Booby Hole Creek...	Otter Creek.........	Near center of T. 25 S., R. 1 E., at N. McMillan's ranch about 25 miles southeast of Richfield, and 5 miles northeast of Burrville, Utah.	....	.9
May 12	Allen ditch..........	East Fork Sevier River.	NE. ¼ sec. 15, T. 30 S., R. 3 W., 100 feet south of Kingston canal station at edge of town of Kingston, on road leading to Coyoto, Utah.	....	5.8
Aug. 10	.....do............	.....do..............	.....do....................	....	4.5
June 12	.....do............	.....do..............	.....do....................	....	3.9
16	Cottonwood Creek...	Sevier River........	Approximately in sec. 13, T. 28 S., R. 4 W., about 1 mile above plant of Mineral Products Co., and 7 miles southwest of Marysvale, Utah.	....	43
Sept. 14	.....do............	.....do..............	.....do....................	....	3.7
May 17	Sevier Valley canal..	Sevier River........	NW. ¼ sec. 21, T. 24 S., R. 3 W., at highway bridge north edge of town of Elsinore, Utah.	....	265
Aug. 14	State canal..........	Continuation of Sevier Valley canal.	SE ¼ sec. 12, T. 22 S., R. 2 W., end of district No. 1, about 2 miles southwest of Aurora, Utah.	2.14	148
June 20	.....do............	.....do..............	SE. ¼ sec. 20, T. 21 S., R. 1 W., at flume of State canal over Denmark Wash about 3 miles west of Salina, Utah.	4.80	164
July 17	.....do............	.....do..............	.....do....................	4.80	169
19	.....do............	.....do..............	.....do....................	2.75	73

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916—Continued.

Sevier Lake basin—Continued.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916.				*Feet.*	*Sec.-ft.*
June 20	State canal	Construction of Sevier Valley canal.	NW. ¼ sec. 3, T. 21 S., R. 1 W., end of district No. 2, about 2 miles west of Redmond, Utah.	1.75	153
July 26	Brown ditch	State canal	SW. ¼ sec. 11, T. 20 S., R. 1 W., about ½ mile north of station on State canal, 5 miles northwest of Redmond, Utah.		9.3
Jan 22	Drain ditch	Sevier River	NW. ¼ sec. 32, T. 23 S., R. 2 W., 200 feet below Vermilion canal heading about 2½ miles east and ¾ mile south of courthouse, Richfield, Utah.		16
Mar. 28	Black Knoll Spring	do	NE. ¼ sec. 1, T. 23 S., R. 2 W., at Black Knoll ranch, about 1 mile south of Sigurd, Utah.		4.9
June. 19	Salina Irrigation Co. canal.	Salina Creek	SE. ¼ sec. 25, T. 21 S., R. 1 W., immediately below measuring weir and waste gate, about 1½ miles southeast of White House Hotel, Salina, Utah.		57
Apr. 5	Drain No. 5	Sevier River	T. 19 S., R. 1 W., between State road Centerfield to Westview on the south, and San Pitch River on north, about 2 miles west of Centerfield, Utah.		.3
5	Drain No. 4	do	do		6.1
5	Drain No. 3	do	do		1.1
5	Drain No. 2	do	do		.5
5	Drain No. 1	do	do		4.0
May 11	Kearns ditch	Dover canal	SE. ¼ sec. 23, T. 19 S., R. 1 W., 50 feet below head which is between Dover canal gage and weir near Gunnison, Utah.		5.3
May 10	East Branch of Wellington canal.	Sevier River	NW. ¼ sec. 34, T. 15 S., R. 2 W., about 200 feet below heading and 2½ miles southwest of Mills, Utah.		12
Jan. 23	Chicken Creek	do	NW. ¼ sec. 26, T. 15 S., R. 2 W., about ½ mile southeast of Mills, Utah.		4.4
Feb. 16	do	do	do		8.8
May 3	Canal B	Canal A	Sec. 31, T. 16 S., R. 6 W., 250 feet below heading and 1½ miles north of Delta, Utah.	4.43	296
3	do	do	do	4.44	304
4	do	do	do	4.50	303
10	do	do	do	3.78	241
3	do	do	SE. ¼ sec. 25, T. 16 S., R. 7 W., at flume over river about 1¼ miles below head of canal, and about 2 miles north of Delta, Utah.		298
3	Canal B	Canal A	Between secs. 34 and 35, T. 16 S., R. 7 W., about 4 miles northwest of Delta, Utah.		284
4	Canal B 5	Canal B	NE. ¼ sec. 22, T. 16 S., R. 7 W., at head near Woodrow, Utah.		124
4	do	do	Corner of secs. 9, 10, 15, and 16, T. 16 S., R. 7 W., at Tracy Bridge, Woodrow, Utah.		113
4	Canal B 6	do	SE. corner of sec. 10, T. 16 S., R. 7 W., 150 feet below head, 1 mile east of Woodrow, Utah.		59
4	do	do	do		100
5	do	do	do		56
6	do	do	do		58
July 13	do	do	do		62
13	do	do	do		65
May 6	do	do	NW. ¼ SW. ¼ sec. 26, T. 15 S., R. 7 W., station 293+22, 5 miles below head, near Sugarville, Utah.		44
July 13	do	do	do		51
May 6	do	do	On line between secs. 9 and 16, T. 15 S., R. 7 W., at Carbury's ranch, near Sugarville, Utah.		24
July 13	do	do	do		48

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916—Continued.

Sevier Lake basin—Continued.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916.				*Feet.*	*Sec.-ft.*
July 13	Lateral B 6 E	Canal B 6	SW. ¼ sec. 16, T. 15 S., R. 7 W., 50 feet below head gates near Sugarville, Utah.		4.7
May 5	Canal B 9	Canal B	SW. ¼ sec. 34, T. 15 S., R. 7 W., 60 feet below head, 2½ miles southeast of Sugarville, Utah.		35
6	do	do	do		30
5	do	do	NW. ¼ sec. 21, T. 15 S., R. 7 W., 2 miles north of Sugarville, Utah.		17
6	do	do	do		24
10	Canal C	Canal A	Sec. 31, T. 16 S., R. 6 W., about 200 feet below head gates and 1½ miles north of Delta, Utah.	2.77	76
1914.					
Oct. 11	Midland canal	Abraham canal	SW. ¼ sec. 10, T. 17 S., R. 7 W., 75 feet below head of canal, and 3½ miles west of Delta, Utah.	4.27	4.6
1915.					
May 21	do	do	do	4.38	6.4
June 25	do	do	do	4.66	9.7
July 16	do	do	do	4.21	3.9
23	do	do	do	4.28	4.2
30	do	do	do	4.40	5.1
Aug. 3	do	do	do		.0
21	do	do	do		.0
Sept. 3	do	do	SW. ¼ sec. 10, T. 17 S., R. 7 W., 75 feet below head of canal and 3½ miles west of Delta, Utah.		.0
Oct. 8	do	do	do	4.49	6.9
1916.					
Apr. 28	do	do	do	4.80	12.0
May 15	do	do	do	5.20	18.0
22	do	do	do	4.98	15.0
30	do	do	do	4.99	14.0
June 7	do	do	do	4.71	9.4
1915.					
Oct. 8	Abraham canal	Sevier River	SW. ¼ sec. 10, T. 17 S., R. 7 W., about 600 feet below head of canal, 3½ miles west of Delta, Utah.	4.39	26.1
25	do	do	do	4.78	29.9
Nov. 3	do	do	do	5.10	43.5
13	do	do	do	4.73	34.8
18	do	do	do	4.69	16.9
1916.					
Mar. 27	do	do	do	3.93	4.50
Apr. 28	do	do	do	5.89	87.6
May 15	do	do	do	6.39	136.3
22	do	do	do	5.88	99.0
30	do	do	do	5.56	73.0
June 8	do	do	do	5.98	89.0
20	do	do	do	5.92	71.3
30	do	do	do	6.24	66.5
July 10	do	do	do	6.25	79.9
28	do	do	do	6.01	68.6
Aug. 31	do	do	do	5.18	34.9
Sept. 5	do	do	do	4.75	20.5
22	do	do	do	4.91	10.1
1915.					
Oct. 8	Deseret High Line canal.	do	Sec. 15, T. 17 S., R. 7 W., 400 feet below head of canal, about 3 miles west of Delta, Utah.	4.30	23.2
25	do	do	do	4.46	31.8
Nov. 3	do	do	do	4.62	29.0
13	do	do	do	4.61	25.6
18	do	do	do	3.90	8.54
1916.					
Mar. 31	do	do	do	3.86	20.1
Apr. 8	do	do	do	5.27	21.5

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916—Continued.

Sevier Lake basin—Continued.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916.				*Feet.*	*Sec.-ft.*
Apr. 21	Deseret High Line canal.	Sevier River	Sec. 15, T. 17 S., R. 7 W., 400 feet below head of canal, about 3 miles west of Delta, Utah.	4.40	18.1
28	do	do	do	5.12	76.2
May 8	do	do	do	5.83	117
15	do	do	do	5.99	115
22	do	do	do	4.66	23.8
28	do	do	do	5.10	39.9
June 8	do	do	do	6.15	61.8
20	do	do	do	5.88	71.2
30	do	do	do	5.88	56.9
July 10	do	do	do	5.46	56.5
28	do	do	do	4.61	30.0
Aug. 31	do	do	do	5.23	30.8
Sept. 6	do	do	do	4.93	26.6
22	do	do	do	4.39	28.5
1915.					
Oct. 8	Deseret canal	do	SE. ¼ sec. 15, T. 17 S., R. 7 W., 300 feet below head of canal, about 2½ miles west of Delta, Utah.	4.35	48.2
27	do	do	do	4.70	45.8
Nov. 3	do	do	do	4.67	34.8
13	do	do	do	4.70	39.8
18	do	do	do	4.66	29.9
1916.					
Mar. 27	do	do	do	4.86	47.5
31	do	do	do	4.86	57.5
Apr. 21	do	do	do	4.30	89.6
28	do	do	do	4.39	103.0
May 8	do	do	do	4.68	124.0
15	do	do	do	4.39	96.3
22	do	do	do	4.26	75.1
June 7	do	do	do	4.44	84.7
20	do	do	do	4.23	97.9
30	do	do	do	4.54	66.4
July 10	do	do	do	4.80	85.9
28	do	do	do	4.66	45.2
Aug. 31	do	do	do	4.29	38.4
Sept. 5	do	do	do	4.35	43.3
22	do	do	do	3.98	30.5

Beaver River basin.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916.					
Sept. 15	Beaver River		NW. ¼ sec. 11, T. 30 S., R. 9 W., at approximate site of gage established June 1 for gaging station Beaver River below Rockyford dam, near Minersville, Utah.		6.2
15	do		NW. ¼ sec. 7, T. 30 S., R 9 W., 300 feet above heading of Minersville canal, 1½ miles east of Minersville, Beaver County, Utah.		6.5

Minor basins in Nevada.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916.					
June 22	Lehman Creek	Snake Valley	Sec. 10, T. 13 N., R. 69 E., Mount Diablo meridian, ½ mile above ranch house, and 5 miles west of Baker, White Pine County, Nev.		4.5
22	Baker Creek	Lehman Creek	Sec. 14, T. 13 N., R. 69 E., Mount Diablo meridian, at former gaging station Baker Creek, near Baker, Nev.	1.80	39
22	Canal	Baker Creek	Near old gaging station on Baker Creek. Flow should be added to that of Baker Creek to get total in creek above diversions.		7.8

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916—Continued.

Minor basins in Nevada—Continued.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916.				*Feet.*	*Sec.-ft.*
June 24	White River	White River Valley.	Former gaging station White River near Preston, Nev.	0.8	4.2
24	Preston Springs	White River	Flume where stream is divided between the towns of Preston and Lund. About 1 mile northwest of Preston, Nev.		8.0
24	Spring	Lund Canal	Road crossing 100 feet below spring near school house in Preston.		3.4
May 5	Duckwater canal	Big Warm Spring	20 feet below headgate, 1,000 feet below Big Warm Spring, near Duckwater.		.8
5	do	do	100 feet above Tognoni's weir		.9
Aug. 25	Tognoni's canal	do	20 feet below Tognoni's weir		1.3
May 5	Overflow from Tule Swamp.	do	Head of feeder canal to Duckwater Canal.		1.8
Aug. 25	do	do	Weir ½ mile below head of feeder canal.		1.6
1915 Nov. 21	Little Warm Spring.	Little Warm Spring.	150 feet below spring and above Tule Swamp, near Duckwater.		2.7
21	do	do	300 feet below weir just below Tule Swamp.		2.3
1916 Aug. 25	East Fork Duckwater Creek.	Duckwater Creek	Near junction with Duckwater Creek in sec. 36, T. 14 N., R. 56 E.		5.3

Walker Lake basin.

1915. Dec. 17	Sprague canal	Walker River	100 feet below headgate, 300 feet below highway bridge across Walker River, at Mason, Nev.		15
1916 Jan. 14	do	do	do		5.2

Humboldt River basin.

1916. June 20	Secret Creek	Lamoille Creek	Sec. 2 T. 34 N., R. 59 E., opposite mouth of abandoned mine tunnel, 14 miles southeast of Halleck, Nev.		16
Mar. 22	Pine Creek	Humboldt River	Former gaging station, Pine Creek, near Palisade, Nev.	2.20	155
June 5	do	do	do		1.9
15	Rock Creek	do	Overland trail, highway bridge at mouth of canyon, 25 miles northeast of Battle Mountain, Nev.		14

Pyramid and Winnemucca lakes basin.

1916. June 6	Galena Creek	Steamboat Creek	Former gaging station, Galena Creek, near Washoe, Nev.		41

Honey Lake basin.

1916. Feb. 6	Janesville Creek	Baxter Creek	SW. ¼ sec. 9, T. 29 N., R. 13 E., at abandoned U. S. Geological Survey station, 50 feet from old Masonic building, at Janesville, Cal.	1.35	0.8

Abert Lake basin.

1915. Oct. 3	Ana River	Summer Lake	SE. ¼ sec. 6, T. 30 S., R. 17 E., near Summer Lake, Oreg.		132

Miscellaneous discharge measurements in Great Basin during the year ending Sept. 30, 1916—Continued.

Malheur Lake basin.

Date.	Stream.	Tributary to or diverts from—	Locality.	Gage height.	Discharge.
1916.				*Feet.*	*Sec.-ft.*
Apr. 14	Silvies River	Malheur Lake	Canyon City road, northeast of Burns.	0.00	1,040
May 1	do	do	do	−1.00	660
19	do	do	do	−1.92	354
June 1	do	do	do	−1.86	337
15	do	do	do	−2.28	174
Apr. 14	Foley Slough	Defluent of Silvies River.	do		837
May 1	do	do	do		311
6	do	do	do		202
19	do	do	do		52
June 1	do	do	do		58
15	do	do	do		0
Apr. 14	Whiting Slough	do	do		250
May 1	do	do	do		122
19	do	do	do		33.6
June 1	do	do	do		28.5
15	do	do	do		0
Apr. 14	Poison Slough	do	Sec. 32, T. 22 S., R. 31 E., northeast of Burns.		47.2
May 1	do	do	do		*a* 17.5
19	do	do	do		*a* 2.7
June 1	do	do	do		*a* 2.0
15	do	do	do		0
9	Warm Springs	Donner und Blitzen River.	Sec. 12, T. 32 S., R. 32 E., on "P" Ranch.		1.4
May 4	East side ditch	do	Gram camp in sec. 26, T. 29 S., R. 31 E.	4.32	8.2
June 10	do	do	do	4.31	8.3

a Estimated.

Harney Lake basin.

1916.					
Apr. 12	Silver Creek	Harney Lake	Near mouth		83
13	do	do	do		91
24	do	do	do		26
May 1	do	do	do		0
Apr. 24	Unnamed ditch	Silver Creek	Sec. 27, T. 26 S., R. 29 E		12
13	"OO" Spring	Harney Lake	Sec. 34, T. 26 S., R. 28 E		15.8
May 14	do	do	do		15.7
Apr. 12	"OO" barn yard spring.	do	Sec. 36, T. 26 S., R. 28 E		6.6
May 15	do	do	do		5.8
Apr. 12	East "OO" spring	do	do		2.1
May 15	do	do	do		2.7
Apr. 12	Johnson Spring	do	Sec. 6, T. 27 S., R. 29 E		1.5
12	Hughet Spring	do	Sec. 10, T. 27 S., R. 29 E., 1 mile below head.		13.6
24	do	do	do		9.2
12	Sizemore upper spring.	do	Sec. 9, T. 27 S., R. 29 E		1.5
May 14	do	do	do		2.1
Apr. 12	Sizemore lower spring.	do	NW. ¼ sec. 15, T. 27 S., R. 29 E.		1.4
May 14	do	do			1.6
Apr. 12	"OO" drainage canal	do	About sec. 3, T. 27 S., R. 29 E.		16.1
24	do	do	do		12.9
May 1	do	do	do		0

Catlow Valley.

1916.					
Nov. 17	Roaring Springs	Sink	Roaring Springs ranch, in sec. 6, T. 34 S., R. 32 E.		5.8
May 4	do	do	do		6.7

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STREAM-GAGING STATIONS

AND

PUBLICATIONS RELATING TO WATER RESOURCES

PART X. THE GREAT BASIN

STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES.

INTRODUCTION.

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, professional papers, monographs, and annual reports.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below.

Part I. North Atlantic slope basins.
II. South Atlantic and eastern Gulf of Mexico basins.
III. Ohio River basin.
IV. St. Lawrence River basin.
V. Upper Mississippi River and Hudson Bay basins.
VI. Missouri River basin.
VII. Lower Mississippi River basin.
VIII. Western Gulf of Mexico basins.
IX. Colorado River basin.
X. Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins, in three volumes:
    A. Pacific slope basins in Washington and upper Columbia River basin.
    B. Snake River basin.
    C. Lower Columbia River basin and Pacific slope basins in Oregon.

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below.

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

2. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office. Washington, D. C., who will furnish lists giving prices.

3. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

4. Complete sets are available for consultation in the local offices of the water-resources branch of the Geological Survey, as follows:

Boston, Mass., 2500 Customhouse.
Albany, N. Y., Room 704, Journal Building.
Atlanta, Ga., Post Office Building.
Madison, Wis., care of Railroad Commission of Wisconsin.
Boise, Idaho, 615 Idaho Building.
Helena, Mont., Montana National Bank Building.
Topeka, Kans., 25 Federal Building.
Austin, Tex., Capitol Building.
Denver, Colo., 403 New Post Office Building.
Tucson, Ariz., University of Arizona.
Salt Lake City, Utah, 421 Federal Building.
Tacoma, Wash., 406 Federal Building.
Portland, Oreg., 606 Post Office Building.
San Francisco, Cal., 328 Customhouse.
Los Angeles, Cal., 619 Federal Building.
Honolulu, Hawaii, 14 Capitol Building.

A list of the Geological Survey's publications may be obtained by applying to the Director of the United States Geological Survey, Washington, D. C.

STREAM-FLOW REPORTS.

Stream-flow records have been obtained at more than 4,100 points in the United States, and the data obtained have been published in the reports tabulated below:

Stream-flow data in reports of the United States Geological Survey.

[A=Annual Report; B=Bulletin; W=Water-Supply Paper.]

Report.	Character of data.	Year.
10th A, pt. 2	Descriptive information only	
11th A, pt. 2	Monthly discharge and descriptive information	1884 to Sept., 1890.
12th A, pt. 2	.....do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and ratings	1893 and 1894.
16th A, pt. 2	Descriptive information only	
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
W 11	Gage heights (also gage heights for earlier years)	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
W 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
W 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
W 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.

Stream-flow data in reports of the United States Geological Survey—Continued.

[A=Annual Report; B=Bulletin; W=Water-Supply Paper.]

Report.	Character of data.	Year.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898
W 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
W 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
W 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
W 75	Monthly discharge	1901.
W 82 to 85	Complete data	1902.
W 97 to 100	do	1903.
W 124 to 135	do	1904.
W 165 to 178	do	1905.
W 201 to 214	do	1906.
W 241 to 252	do	1907–8.
W 261 to 272	do	1909.
W 281 to 292	do	1910.
W 301 to 312	do	1911.
W 321 to 332	do	1912.
W 351 to 362	do	1913.
W 381 to 394	do	1914.
W 401 to 414	do	1915.
W 431 to 444	do	1916.

NOTE.—No data regarding stream flow are given in the 15th and 17th annual reports.

The records at most of the stations discussed in these reports extend over a series of years, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The table which follows gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1916. The data for any particular station will in general be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Maine, 1903 to 1916, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, 351, 381, 401, and 431, which contain records for the New England streams from 1903 to 1916. Results of miscellaneous measurements are published by drainage basins.

In these papers and in the following lists the stations are arranged in downstream order. The main stem of any river is determined by measuring or estimating its drainage area—that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. All stations from the source to the mouth of the main stem of the river are presented first, and the tributaries in order from source to mouth follow, the streams in each tributary basin being listed before those of the next basin below.

In exception to this rule the records for Mississippi River are given in four parts, as indicated on page III, and the records for large lakes are taken up in order of streams around the rim of the lake.

Numbers of water-supply papers containing results of stream measurements, 1899–1916.

Year.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
												North Pacific slope basins.		
	North Atlantic slope basins (St. John River to York River).	South Atlantic and eastern Gulf of Mexico basins (James River to the Mississippi).	Ohio River basin.	St. Lawrence River and Great Lakes basins.	Hudson Bay and upper Mississippi River basins.	Missouri River basin.	Lower Mississippi River basin.	Western Gulf of Mexico basins.	Colorado River basin.	Great Basin.	Pacific slope basins in California.	Pacific slope basins in Washington and upper Columbia River basin.	Snake River basin.	Lower Columbia River basin and Pacific slope basins in Oregon.
1899 [a]	35	[b] 35, 36	36	36	36	[c] 36, 37	37	37	[d] 37, 38	38, [e] 39	38, [f] 39	38	38	38
1900 [g]	47, [h] 48	48	48, [i] 49	49	49	49, [j] 50	50	50	50	51	51	51	51	51
1901	65, 75	65, 75	65, 75	65, 75	[k] 65, 66, 75	66, 75	[k] 65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902	82	[b] 82, 83	83	[l] 82, 83	[k] 83, 85	84	[k] 83, 84	84	85	85	85	85	85	85
1903	97	[b] 97, 98	98	97	[k] 98, 99, [m] 100	99	[k] 98, 99	99	100	100	100	100	100	100
1904	[n] 124, [o] 125, [p] 126	[p] 126, 127	128	129	[k] 128, 130	130, [q] 131	[k] 128, 131	132	133	133, [r] 134	134	135	135	135
1905	[n] 165, [o] 166, [p] 167	[p] 167, 168	169	170	171	172	[k] 169, 173	174	175, [s] 177	176, [r] 177	177	178	178	[t] 177, 178
1906	[n] 201, [o] 202, [p] 203	[p] 203, 204	205	206	207	208	[k] 205, 209	210	211	212, [r] 213	213	214	214	214
1907–8	241	242	243	244	245	246	247	248	249	250, [r] 251	251	252	252	252
1909	261	262	263	264	265	266	267	268	269	270, [r] 271	271	272	272	272
1910	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912	321	322	323	324	325	326	327	328	329	330	331	332–A	332–B	332–C
1913	351	352	353	354	355	356	357	358	359	360	361	362–A	362–B	362–C
1914	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915	401	402	403	404	405	406	407	408	409	410	411	412	413	414
1916	431	432	433	434	435	436	437	438	439	440	441	442	443	444

[a] Rating tables and index to Water-Supply Papers 35-39 contained in Water-Supply Paper 39. Tables for monthly discharge for 1899 in Twenty-first Annual Report, Part IV.

[b] James River only.

[c] Gallatin River.

[d] Green and Gunnison rivers and Grand River above junction with Gunnison.

[e] Mohave River only.

[f] Kings and Kern rivers and south Pacific slope drainage basins.

[g] Rating tables and index to Water-Supply Papers 47-52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Tables for monthly discharge rates for 1900 in Twenty-second Annual Report, Part IV.

[h] Wissahickon and Schuylkill rivers to James River.

[i] Scioto River.

[j] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

[k] Tributaries of Mississippi from east.

[l] Lake Ontario and tributaries to St. Lawrence River proper.

[m] Hudson Bay only.

[n] New England rivers only.

[o] Hudson River to Delaware River, inclusive.

[p] Susquehanna River to Yadkin River, inclusive.

[q] Platte and Kansas rivers.

[r] Great Basin in California except Truckee and Carson river basins.

[s] Below junction with Gila.

[t] Rogue, Umpqua, and Siletz rivers only.

PART X. THE GREAT BASIN.

PRINCIPAL DIVISIONS.

The Great Basin is made up of a number of minor basins whose streams do not discharge into the ocean. The largest of these minor basins are the depressions that hold Great Salt Lake, Sevier Lake, Humboldt Sink, Truckee, Walker, Carson, and Owens rivers, and Honey, Mono, Malheur, Harney, Warner, Abert, Summer, and Silver lakes. The streams of this section drain wholly or in part the States of California, Idaho, Nevada, Oregon, Utah, and Wyoming.

In addition to the list of gaging stations and the annotated list of publications relating specifically to the section, these pages contain a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects, and also brief references to reports published by State and other organizations (see p. XXIV).

GAGING STATIONS.

NOTE.—Dash after a date indicates that station was being maintained September 30, 1916. Period after a date indicates discontinuance.

GREAT SALT LAKE BASIN.

- Great Salt Lake at Saltair, Utah, 1904; 1912–
- Great Salt Lake at Midlake, Utah, 1912–
- Great Salt Lake at Garfield Beach gage, Utah, 1875–1899.
  - Bear River near Evanston, Wyo., 1913–
  - Bear River near Harer, Idaho, 1913–1916.
  - Bear River at Dingle, Idaho, 1903–1914.
  - Bear River at Soda Springs, Idaho, 1896.
  - Bear River at Alexander, Idaho, 1911–1916.
  - Bear River near Preston, Idaho, 1889–
  - Bear River near Collinston, Utah, 1889–
    - Bear (Mud) Lake inlet canal near Dingle, Idaho, 1911–1913.
    - Bear Lake at Fishaven, Idaho, 1903–1906.
    - Georgetown Creek near Georgetown, Idaho, 1911–1914.
    - Soda Creek near Soda Springs, Idaho, 1913–
    - Cub Creek near Franklin, Idaho, 1900–1901.
    - Logan River above State dam, near Logan, Utah, 1913–
    - Logan River near Logan, Utah, 1896–1912.
    - Logan River below State dam, near Logan, Utah, 1913–14.
    - Logan River below Logan Northern canal, near Logan, Utah, 1915–
      - Utah Power & Light Co.'s tailrace near Logan, Utah, 1913–
      - Logan, Hyde Park, and Smithfield canal near Logan, Utah, 1904–1907; 1909–
      - Logan Northern canal near Logan, Utah, 1913–1916.
      - Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, 1900–1902; 1913–
      - Blacksmith Fork at Utah Power & Light Co.'s plant, near Hyrum, Utah, 1914–

- Great Salt Lake—Continued.
  - Bear River tributaries—Continued.
    - Logan River—Continued.
      - Blacksmith Fork below Utah Power & Light Co.'s plant, near Hyrum, Utah, 1904–1910; 1914–
        - Hyrum city power canal (Blacksmith Fork power-plant race) near Hyrum, Utah, 1904–1910; 1914–
    - West Side canal near Collinston, Utah, 1912–
    - Hammond (East Side) canal near Collinston, Utah, 1912–
    - Little Malad River near Malad, Idaho, 1911–1913.
    - Box Elder Creek at Brigham, Utah, 1909–1912.
  - Weber River near Oakley, Utah, 1904–
  - Weber River at Devils Slide (Croydon), Utah, 1905–
  - Weber River near Uinta, Utah, 1889–1903.
  - Weber River near Plain City, Utah, 1903–
    - Chalk Creek at Coalville, Utah, 1904–5.
    - Lost Creek near Croydon, Utah, 1905.
    - Ogden River at upper end of canyon, near Ogden, Utah, 1895–6.
    - Ogden River at Utah Light & Railway Co.'s dam, near Ogden, Utah, 1904–1912.
    - Ogden River at powder mill, near Ogden, Utah, 1889–90; 1897–1899.
  - Mill Creek near Bountiful, Utah, 1913–14.
  - Jordan River near Lehi, Utah, 1904; 1913–
    - Utah Lake near Spanish Fork, Utah, 1889–1896.
    - Utah Lake at Geneva, near outlet, Utah, 1896–1900.
      - Summit Creek near Santaquin, Utah, 1905; 1910–
      - Peteetneet Creek near Payson, Utah, 1910–
      - Spanish Fork at Thistle, Utah, 1907–
      - Spanish Fork near Spanish Fork (Mapleton), Utah, 1900–1901; 1903–
      - Spanish Fork at Lake Shore, Utah, 1903–1907; 1909–
        - Diamond Fork near Thistle, Utah, 1907–
        - United States Reclamation Service power canal near Spanish Fork, Utah, 1909–
      - Hobble Creek near Springville, Utah, 1904–1916.
      - Maple Creek near Springville, Utah, 1910–1913.
      - Provo River at Forks, Utah, 1911–
      - Provo River above Telluride Power Co.'s dam, near Provo, Utah, 1905–1911.
      - Provo River at mouth of canyon, near Provo, Utah, 1889–1906.
      - Provo River at Denver & Rio Grande Railroad bridge, near Provo, Utah, 1905.
      - Provo River at San Pedro, Los Angeles & Salt Lake Railroad bridge, near Provo, Utah, 1903–4.
        - South Fork of Provo River at Forks, Utah, 1911–
      - American Fork above South Fork, near American Fork, Utah, 1912–1915.
      - American Fork near American Fork, Utah, 1900–1901; 1903–1905.
        - South Fork of American Fork near American Fork, Utah, 1912–1915.
    - Little Cottonwood Creek near Salt Lake City, Utah, 1898–1913.
    - Big Cottonwood Creek near Salt Lake City, Utah, 1898–1913.
    - Mill Creek near Salt Lake City, Utah, 1898–1913.
    - Parleys Creek near Salt Lake City, Utah, 1898–1913.
      - Emigration Creek near Salt Lake City, Utah, 1898–1913.
    - City Creek near Salt Lake City, Utah, 1898–1913.

SEVIER LAKE BASIN.

- Mammoth Creek (head of Sevier River) near Hatch, Utah, 1912; 1913–14; 1915–
- Sevier River at Hatch, Utah, 1911–
- Sevier River near Panguitch, Utah, 1914.
- Sevier River below Old Houston canal near Panguitch, Utah, 1916.
- Sevier River near Circleville, Utah, 1912; 1914–
- Sevier River near Kingston, Utah, 1914–
- Sevier River near Junction, Utah, 1911; 1912–1916.
- Piute reservoir near Marysvale, Utah, 1914–
- Sevier River below Piute dam, near Marysvale, Utah, 1911; 1912–
- Sevier River at Pitts ranch, near Marysvale, Utah, 1906–1911.
- Sevier River at Marysvale, Utah, 1912–1914.
- Sevier River at Sevier, Utah, 1911–
- Sevier River near Richfield, Utah, 1916–
- Sevier River at Joseph, Utah, 1889.
- Sevier River near Vermilion, Utah, 1912; 1914–
- Sevier River near Gunnison, Utah, 1900–
- Sevier River at Clarks bridge, near Fayette, Utah, 1914–1916.
- Sevier River at McArtie's Ford, near Fayette, Utah, 1914; 1915.
- Sevier Bridge reservoir near Juab, 1914–
- Sevier River near Juab, Utah, 1911–
- Sevier River near Mills, Utah, 1914–
- Sevier River at Leamington, Utah, 1889–1898; 1912–1914.
- Sevier River near Lynndyl, Utah, 1914–
- Delta and Melville reservoir near Delta, Utah, 1914–
- Sevier River near Delta, Utah, 1912; 1913–
- Gunnison Bend reservoir near Delta, Utah, 1914–
- Sevier River at Oasis, Utah, 1913–
    - Hatch Bench canal near Hatch, Utah, 1914; 1916–
    - Asay Creek near Hatch, Utah, 1912; 1913–14.
    - State canal near Panguitch, Utah, 1913; 1914–
    - Long canal near Panguitch, Utah, 1914–
    - East Panguitch canal near Panguitch, Utah, 1914–
    - Panguitch Creek above canals near Panguitch, Utah, 1915–
    - Barton and LeFevre canal near Panguitch, Utah, 1915–
    - McEwen canal near Panguitch, Utah, 1914–
    - Old Houston canal near Panguitch, Utah, 1915–
    - Fox canal near Circleville, Utah, 1914–
    - Circleville canal near Circleville, Utah, 1914–
    - Old Kingston canal near Circleville, Utah, 1914–
    - Dalton canal at Circleville, Utah, 1914–
    - Mitchell Slough:
        - Mitchell Slough canal near Junction, Utah, 1914–
    - Junction Middle canal near Junction, Utah, 1915–
    - East Fork of Sevier River at Coyoto, Utah, 1914–
    - East Fork of Sevier River above Otter Creek, near Coyoto, Utah, 1915–16.
    - East Fork of Sevier River near Kingston, Utah, 1912–
    - East Fork of Sevier River at Junction, Utah, 1913.
        - Coyoto canal near Coyoto, Utah, 1916–
        - Otter Creek above reservoir, near Coyoto, Utah, 1915–
        - Otter Creek reservoir near Coyoto, Utah, 1914.
        - Otter Creek reservoir canal near Coyoto, Utah, 1914–
        - Otter Creek near Coyoto, Utah, 1913–
        - Kingston canal at Kingston, Utah, 1914–

Sevier River tributaries—Continued.
- Pine Creek at Marysvale, Utah, 1914.
- Clear Creek at Sevier, Utah, 1912–
    - Cove canal at Sevier, Utah, 1914–
- Monroe South Bend canal near Joseph, Utah, 1914–
- Sevier Valley canal near Joseph, Utah, 1912–
- Sevier Valley canal at Elsinore, Utah, 1913.
- Sevier Valley canal near Richfield, Utah, 1912–
- State canal near Vermilion, Utah, 1913.
- State canal near Aurora, Utah, 1913.
- State canal near Salina, Utah, 1913.
- State canal near Redmond, Utah, 1913–
    - Joseph canal near Joseph, Utah, 1914–
- Wells canal near Joseph, Utah, 1914–
- Monroe canal near Elsinore, Utah, 1914–
- Elsinore canal near Elsinore, Utah, 1914–
- Brooklyn canal near Elsinore, Utah, 1914–
- Richfield canal near Elsinore, Utah, 1914–
- Annabella canal at Elsinore, Utah, 1914–
- Vermilion canal near Richfield, Utah, 1914–
- Rockyford canal near Vermilion, Utah, 1914–
- Salina Creek at Salina, Utah, 1914–
- West View canal at Redmond, Utah, 1914–
- Fayette canal near Centerville, Utah, 1914–
- Dover canal near Gunnison, Utah, 1914–
- San Pitch River near Gunnison, Utah, 1900–1905; 1912–
    - Manti Creek near Manti, Utah, 1900.
- Wellington canal near Mills, Utah, 1914–
- Sevier River Land & Water Co.'s canal near Leamington, Utah, 1914–
- Sevier River Land & Water Co.'s canal above Fool Creek reservoir, near Lynndyl, Utah, 1914.
    - Sevier River Land & Water Co.'s by-pass near Lynndyl, Utah, 1914.
- Sevier River Land & Water Co.'s reservoir No. 1 (Fool Creek reservoir) near Lynndyl, Utah, 1914.
- McIntyre canal near Leamington, Utah, 1914–
- Leamington canal near Leamington, Utah, 1914–
- Delta and Mellville canal (Canal A) near Delta, Utah, 1912–
    - Canal B at intake, near Delta, Utah, 1912.
        - Lyman's ditch near Delta, Utah, 1912.
    - Melville West Side canal near Delta, Utah, 1912.
    - Canal C at head gate near Delta, Utah, 1912.
- Melville Main canal near Delta, 1912.
- Midland canal near Delta, Utah, 1914.
- Abraham canal near Delta, Utah, 1913; 1914.
- Deseret High-Line canal near Delta, Utah, 1913; 1914.
- Deseret canal near Delta, Utah, 1913; 1914.
    - Smith canal near Delta, Utah, 1914.

STREAMS IN PAVANT VALLEY.

Chalk Creek near Fillmore, Utah, 1914.
Pine Creek near Fillmore, Utah, 1914.
Meadow Creek near Meadow, Utah, 1914.
Corn Creek near Kanosh, Utah, 1914.

BEAVER RIVER BASIN.

- Beaver River near Beaver, Utah, 1906; 1914-
- Beaver River at Adamsville, Utah, 1913-
- Beaver River at Rockyford dam, near Minersville, Utah, 1913-
- Beaver River at Minersville, Utah, 1909-1913.
- Beaver River at Milford, Utah, 1914.
    - South Creek near Beaver, Utah, 1906.
    - North Fork of North Creek (head of North Creek) near Beaver, Utah, 1906.
        - South Fork of North Creek near Beaver, Utah, 1906.
    - Indian Creek at Adamsville, near Beaver, Utah, 1906; 1914-
    - Minersville canal at Minersville, Utah, 1906; 1914.
    - Coal Creek near Cedar City, Utah, 1915-

MINOR BASINS IN NEVADA.

- Thousand Springs Creek near Tecoma, Nev., 1910-1913.
- Snake Creek near Baker, Nev., 1913-15; 1916-17.
- Baker Creek near Baker, Nev., 1913-1915.
- Cleveland Creek near Osceola, Nev., 1914-1916.
- White River near Preston, Nev., 1914.
- Currant Creek at Ranger Station near Currant, Nev., 1913.
- Currant Creek at Cazier's Ranch near Currant, Nev., 1913; 1914-
- Big Warm Spring near Duckwater, Nev., 1915-16.
- Duckwater Creek near Duckwater, Nev., 1915-
- Lees Creek near Pahrump, Nev., 1916.
- Intermittent Springs near Pahrump, Nev., 1916.
- Birch Creek near Austin, Nev., 1913; 1914.

SALTON SINK BASIN.

- Salton Sea near Salton, Cal., 1904—
    - Alamo River near Brawley, Cal., 1909-1912.
    - New River near Brawley, Cal., 1909-1911.

OWENS LAKE BASIN.

- Owens River near Round Valley, Cal., 1903-
- Owens River near Big Pine [Tinemaha], Cal., 1906-
- Owens River near Lone Pine, Cal., 1909-
- Owens River near Citrus, Cal., 1903-1906.
- Owens Lake near Lone Pine (Olancha), Cal., 1908-
    - Rock Creek near Round Valley, Cal., 1903-
        - Pine Creek near Round Valley, Cal., 1903-
    - Owens River canal near Bishop, Cal., 1903-1905.
    - McNally canal near Bishop, Cal., 1903-1905.
    - Farmers canal near Bishop, Cal., 1903-1905.
    - Bishop Creek near Bishop, Cal., 1903-1911.
    - Hillside (North) canal near Bishop, Cal., 1903-1905.
    - Hillside (South) canal near Bishop, Cal., 1903-1905.
    - Powers canal near Bishop, Cal., 1903-1905.
    - Bishop Creek canal near Bishop, Cal., 1903-1905.
    - Collins (George) canal near Bishop, Cal., 1903-1906.
    - Collins (A. O.) canal near Bishop, Cal., 1903-1906.
    - Dell canal near Bishop, Cal., 1903-1906.
    - Big Pine and Owens River canal near Bishop, Cal., 1903-1905.

Owens Lake—Continued.
- Rawson canal near Bishop, Cal., 1903–1905.
- Sanger canal near Alvord, Cal., 1903–1905.
- Baker Creek near Big Pine, Cal., 1908–1911.
- Big Pine Creek near Big Pine, Cal., 1903–1911.
- Tinemaha Creek near Big Pine [Tinemaha], Cal., 1906–1911.
- Birch Creek near Big Pine [Tinemaha], Cal., 1905; 1906–1911.
- Taboose Creek near Aberdeen, Cal., 1906–1911.
- Goodale Creek near Aberdeen, Cal., 1906–1911.
- Division Creek near Independence, Cal., 1906–1910.
- Eightmile (Sawmill) Creek near Independence, Cal., 1906–1910.
- Thibaut Creek near Independence, Cal., 1908–1911.
- East Side canal near Citrus, Cal., 1903–1906.
- Stevens canal near Citrus, Cal., 1903–1905.
- Oak Creek near Independence, Cal., 1905-1911:
- Little Pine (Independence) Creek near Independence, Cal., 1905–1911.
- Shepard Creek near Theve, Cal., 1906–1010.
- Bairs Creek near Thebe, Cal., 1906–1911.
- George Creek near Thebe, Cal., 1906–1911.
- Lone Pine Creek near Lone Pine, Cal., 1906–1911.
  - Tuttle Creek near Lone Pine, Cal., 1906–1911.
- Cottonwood Creek near Olancha, Cal., 1906–1911.
- Ash Creek near Olancha, Cal., 1907–1911.

ANTELOPE VALLEY BASIN.

Littlerock Creek near Palmdale, Cal., 1896–1898.

MOHAVE RIVER BASIN.

Mohave River near Victorville, Cal., 1899–1906.

MONO LAKE BASIN.

Mono Lake near Mono Lake, Cal., 1912–
- Rush Creek near Mono Lake, Cal., 1910–1914.
- Leevining Creek near Mono Lake, Cal., 1910–1916.

WALKER LAKE BASIN.

East Walker River (head of Walker River), Bridgeport, Cal., 1911–1914.
East Walker River near Yerington, Nev., 1902–1908.
East Walker River near Mason, Nev., 1910–1912; 1913–
Walker River near Nordyke, Nev., 1895.
Walker River at Mason, Nev., 1910–1912; 1913–1916.
Wakler River at Schurz, Nev., 1913–
Walker River near Wabuska, Nev., 1902–1908.
- Robinson Creek near Bridgeport, Cal., 1910–1914.
- Buckeye Creek near Bridgeport, Cal., 1910–1914.
  - Swagger Creek near Bridgeport, Cal., 1911-1915.
- West Walker River near Coleville, Cal., 1902–1908; 1909–1910; 1915–
- West Walker River near Wellington, Nev., 1910.
- West Walker River at Smith, Nev., 1910.
- West Walker at Hudson, Nev., 1914–
  - East Fork of West Walker River near Bridgeport, Cal., 1910.

HUMBOLDT-CARSON SINK.

- Carson River basin:
  - Carson River, East Fork (head of Carson River), at Silver King Valley, near Markleeville, Cal., 1910–1913.
- Carson River, East Fork, near Markleeville, Cal., 1910–
- Carson River, East Fork at Rodenbah's ranch, near Gardnerville, Nev., 1900–1906.
- Carson River, East Fork, at Horsehoe Bend, near Gardnerville, Nev., 1908–1910.
- Carson River, East Fork at California-Nevada State Line, 1911–1914.
- Carson River near Empire, Nev., 1895; 1900–
- Carson River near Fort Churchill, Nev., 1911–
- Carson River near Hazen, Nev., 1908–1910.
    - Silver Creek near Markleeville, Cal., 1910–1913.
    - Markleeville Creek above Markleeville, Cal., 1911–
    - Markleeville Creek at Markleeville, Cal., 1910–
      - Pleasant Valley Creek near Markleeville, Cal., 1910–1911.
    - West Fork of Carson River at Woodfords, Cal., 1890–1892; 1900–
- Humboldt River basin:
  - Humboldt River near Elko, Nev., 1895–1902.
  - Humboldt River at Palisade, Nev., 1902–1906; 1911–
  - Humboldt River at Battle Mountain, Nev.,1896–7.
  - Humboldt River near Golconda, Nev., 1894–1909; 1910–
  - Humboldt River near Oreana, Nev., 1896–1909; 1910–
  - Humboldt River near Lovelocks, Nev., 1912–
    - Bishop Creek near Wells, Nev., 1910.
    - Starr Creek near Deeth, Nev., 1913–
    - Marys River at Marys River Cabin, near Deeth, Nev., 1913–14.
    - Marys River at Buena Vista ranch, near Deeth, Nev., 1913–14.
    - Marys River near Deeth, Nev., 1902–3; 1912–
      - Hanks Creek near Deeth, Nev., 1913–14.
    - Lamoille Creek near Lamoille, Nev., 1915–
    - Lamoille Creek near Halleck, Nev., 1913–
    - North Fork of Humboldt River near Peko, Nev., 1898–1900.
    - North Fork of Humboldt River at Devils Gate, near Halleck, Nev., 1913–
    - North Fork of Humboldt River near Halleck, Nev., 1902-1909; 1910–1913.
    - South Fork of Humboldt River near Elko, Nev., 1896–1909; 1910–
    - Maggie Creek at Carlin, Nev., 1913–
    - Pine Creek at Palisade, Nev., 1902–1904; 1912–1914.
    - Rock Creek at Rock Creek ranch, near Battle Mountain, Nev., 1915–
    - Rock Creek near Battle Mountain, Nev., 1896.
    - Reese River near Berlin, Nev., 1913–
      - Big Creek near Austin, Nev., 1913–14; 1916–
    - Humboldt-Lovelocks Irrigation Light & Power Co.'s canal near Mill City, Nev., 1914–
    - Humboldt-Lovelocks Irrigation Light & Power Co.'s canal near Humboldt, Nev., 1914–

PYRAMID AND WINNEMUCCA LAKE BASINS.

- Lake Tahoe at Tahoe, Cal., 1900–
- Truckee River at Tahoe, Cal., 1895–96; 1900–
- Truckee River near Boca, Cal., 1890.
- Truckee River at Iceland, Cal., 1912–
- Truckee River at Nevada-California State line, 1899–1912.
- Truckee River at Laughton, Nev., 1890.

- Truckee River at Reno, Nev., 1906–
- Truckee River near Essex, Nev., 1889.
- Truckee River at Vista, Nev., 1899–1908.
- Truckee River at Clarks, Nev., 1907–1915.
- Truckee River at Derby dam, Nev., 1907–1910.
- Truckee River near Wadsworth, Nev., 1902–1905.
- Lake Winnemucca inlet near Wadsworth, Nev., 1902–1905.
  - Donner Creek at Donner Lake, near Truckee, Cal., 1909–10.
  - Donner Creek near Truckee, Cal., 1902–1914.
  - Prosser Creek near Hobart Mills (Truckee), Cal., 1903–4; 1907–1912.
  - Prosser Creek near Boca, Cal., 1899–90; 1902–3.
    - South Fork of Prosser Creek near Truckee, Cal., 1909–10.
  - Little Truckee River near Truckee, Cal., 1909–10.
  - Little Truckee River near Boca, Cal., 1890.
  - Little Truckee River at Boca, Cal., 1911–1914.
  - Little Truckee River at Pine Station and Starr, Cal., 1903–1910.
    - Webber Creek near Truckee, Cal., 1909–10.
    - Independence Creek below Independence Lake, Cal., 1902–1907.
    - Independence Creek near Truckee, Cal., 1909–10.
  - Steamboat Creek at Steamboat Springs, Nev., 1900–1901.
    - Galena Creek near Washoe, Nev., 1913–14.

HONEY LAKE BASIN.

- Susan River near Susanville, Cal., 1900–1905; 1913.
  - Gold Run Creek near Susanville, Cal., 1913; 1915–16.
  - Lassen Creek near Susanville, Cal., 1913; 1915–16.
  - Willow Creek at Merrillville, Cal., 1904–5.
  - Willow Creek near Standish, Cal., 1900–1901; 1905.
- Baxter Creek near Janesville, Cal., 1913–1916.
  - Schloss Creek at Janesville, Cal., 1915.
  - Janesville Creek at Janesville, Cal., 1913; 1915.

SURPRISE VALLEY DRAINAGE BASIN.

- Bidwell Creek near Fort Bidwell, Cal., 1912.

WARNER LAKES BASIN.

- Cowhead Lake near Fort Bidwell, Cal., 1911–1913.
- Twentymile Creek near Warner Lake, Oreg., 1910–1916.
  - Fifteenmile Creek above Twelvemile Creek, near Fort Bidwell, Cal., 1913.
  - Fifteenmile Creek below Rock Creek, near Fort Bidwell, Cal., 1913.
    - Twelvemile Creek near Fort Bidwell, Cal., 1912–13.
  - Rock Creek near Fort Bidwell, Cal., 1913.
- Deep Creek near Fort Bidwell, Cal., 1913.
- Deep Creek at Big Valley, near Lakeview, Oreg., 1911–1915.
- Deep Creek at Adel, Oreg., 1909–1916.
  - Dismal Creek near Fort Bidwell, Cal., 1913.
  - Camas Creek near Plush, Oreg., 1911–12.
  - Camas Creek below Blue Creek, near Lakeview, Oreg., 1912–1915.
    - Mud Creek near Plush, Oreg., 1911–12; 1915.
    - Crane Creek near Lakeview, Oreg., 1914.
    - Drake Creek near Adel, Oreg., 1915.
    - M. C.-Givan ditch near Adel, Oreg., 1915.
    - Company ditch near Adel, Oreg., 1915.
    - M. C. ditch at Adel, Oreg., 1915.

- Fish Creek near Plush, Oreg., 1914.
- Honey Creek at Chalstrand's ranch, near Plush, Oreg., 1910–11.
- Honey Creek near Plush, Oreg., 1909–1914; 1915.
  - Twelvemile Creek near Plush, Oreg., 1911.
  - Snyder Creek near Plush, Oreg., 1911.
- Pelican Lake near Adel, Oreg., 1913–1915.
- Crump Lake near Adel, Oreg., 1910–1912; 1913; 1914; 1915.
- Hart Lake near Plush, Oreg., 1910–1915.
- Flagstaff Lake inlet near Plush, Oreg., 1914.
- Flagstaff Lake near Plush, Oreg., 1910–1915.
- Lower Campbell Lake near Plush, Oreg., 1914; 1915.
- Stone Corral Lake near Plush, Oreg., 1914; 1915.
- Bluejoint Lake near Plush, Oreg., 1911–1915.

ABERT LAKE BASIN.

- Chewaucan River at dam site, near Paisley, Oreg., 1912–
- Chewaucan River above Mill Creek, near Paisley, Oreg., 1912–
- Chewaucan River at Chewacan Land & Cattle Co.'s gage, near Paisley, Oreg., 1914–
- Chewaucan River above Conn's ditch, near Paisley, Oreg., 1912.
- Chewaucan River at Paisley, Oreg., 1905–1907; 1909–1912; 1913.
- Chewaucan River at Narrows, near Paisley, Oreg., 1914–
- Chewaucan River at Hotchkiss Ford, near Paisley, Oreg., 1914.
  - Conn ditch near Paisley, Oreg., 1914–
  - Smalls Creek at Paisley, Oreg., 1914–
  - Bagley ditch at Paisley, Oreg., 1914–
  - Jones-Innis-ZX ditch near Paisley, Oreg., 1914–
  - Crooked Creek near Valley Falls, Oreg., 1912–13.

SUMMER LAKE BASIN.

- Ana River near Summer Lake, Oreg., 1905; 1909–10.

SILVER LAKE BASIN.

- Silver Creek near Silver Lake, Oreg., 1904–1907; 1909–
  - Bridge Creek near Silver Lake, Oreg., 1905–6; 1911–12.
- Buck Creek near Silver Lake, Oreg., 1905–6; 1909–1911.

MALHEUR AND HARNEY LAKES BASIN.

- Malheur Lake outlet at Narrows, Oreg., 1903–1906; 1911–12; 1913; 1914; 1916.
- Mud Lake outlet near Narrows, Oreg., 1916.
  - Silvies River near Silvies, Oreg., 1903–1905; 1909–1912; 1916–
  - Silvies River near Burns, Oreg., 1903–1906; 1909–1915; 1916–
  - West Fork of Silvies River near Lawen, Oreg., 1916.
  - East Fork of Silvies River near Lawen, Oreg., 1916.
  - Donner und Blitzen River near Diamond, Oreg., 1909–
  - Donner und Blitzen River near Narrows, Oreg., 1915; 1916.
  - Donner und Blitzen River near Voltage, Oreg., 1916–
    - Mud Creek near Diamond, Oreg., 1911–1916.
    - Bridge Creek near Diamond, Oreg., 1911; 1912–1916.
    - Krumbo Creek near Diamond, Oreg., 1911; 1913.
    - Keiger Creek near Diamond, Oreg., 1909–10; 1911; 1912–13; 1916–
      - Cucamonga Creek near Diamond, Oreg., 1911–1913; 1916.
      - McCoy Creek near Diamond, Oreg., 1909–1914; 1916–

Mud Lake outlet—Continued.
- Riddle Creek near Smith, Oreg., 1911.
- Buena Vista canal near Narrows, Oreg., 1915; 1916–
- Silver Creek above Riley, Oreg., 1904–1906; 1909; 1910; flood periods 1911–1915; 1916–
- Silver Creek below Riley, Oreg., 1912; 1913; 1914.

ALVORD LAKE BASIN.

Trout Creek near Denio, Oreg., 1911–12.
Little Cottonwood Creek near Denio, Oreg., 1911–12.

TUMTUM LAKE BASIN.

Van Horn Creek near Denio, Oreg., 1911.

CATLOW VALLEY, DRAINAGE BASIN.

Home Creek near Beckley (Narrows), Oreg., 1911; 1912; 1915–

REPORTS ON WATER RESOURCES OF THE GREAT BASIN.

PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY.

WATER-SUPPLY PAPERS.

Water-supply papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked in this way may, however, be purchased (at price noted) from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Omission of the price indicates that the report is not obtainable from Government sources. Water-Supply Papers are of octavo size.

*7. Seepage water of northern Utah, by Samuel Fortier. 1897. 50 pp., 3 pls. 10c.

Describes Cache Valley and its water supply and seepage waters in Ogden Valley.

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

Describes the location and construction of various types of canals for irrigation.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls. 15c.

Gives elevations and distances along Sevier, Bear, and Humboldt rivers; also brief descriptions.

*57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp. 10c.

*61. Preliminary list of deep borings in the United States, Part II (Nebraska-Wyoming), by N. H. Darton. 1902. 67 pp. 5c.

A second, revised, edition of Nos. 57 and 61 was published in 1905 as Water-Supply Paper 149 (q. v.).

68. Water storage in the Truckee Basin, California-Nevada, by L. H. Taylor. 1902. 90 pp., 8 pls. 10c.

Discusses reservoir sites, water rights for power and irrigation, irrigable lands, duty of water, and necessity for national control of water.

*78. Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell. 1903. 53 pp., 2 pls. 5c.

Discusses briefly the rocks and geologic structure of a part of the Snake River Plains in Canyon and Owyhee counties, Idaho, and Malheur and Harney counties, Oreg.; describes briefly the conditions on which artesian flow depends, and in some detail the springs and drilled wells in the Lewis, Otis, Harney, and Whitehorse artesian basins; also describes artesian wells in alluvial deposits and discusses the size of drill holes, casings, etc., the preservation of well records, and the importance of laws to govern the use of artesian waters; gives list of publications bearing on artesian waters.

*81. California hydrography, by J. B. Lippincott. 1903. 488 pp., 1 pl. 25c.

A collection of published records of stream flow "hitherto much scattered, some of them out of print and difficult to secure," brought together as a book of reference.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 130 pp. Superseded by Water-Supply Paper 152.

Cites statutory restrictions of water pollution in California, Idaho, Nevada, Oregon, Utah and Wyoming.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Cites legislative acts affecting ground waters in California, Idaho, Nevada, Oergon, Utah, and Wyoming.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Discusses flow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal.; gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15c. [Inquiries concerning this report should be addressed to the Reclamation Service.] Contains:

A brief report on "Hydrographic investigations in Nevada," by A. E. Chandler. Gives notes concerning fluctuations and average discharge at stations on Truckee, Humboldt, Carson, and Walker rivers.

A report on "Underground waters of southern California," by W. C. Mendenhall. Discusses the origin, distribution, and character of the artesian waters, the causes of fluctuations in the supply, and the need of moderation in use.

*149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp. 10c.

Gives by States (and within the States by counties), location, depth, diameter, yield, height of water, and other information concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 and 61; mentions also principal publications relating to deep borings.

*152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Cites statutory restrictions of water pollution in California, Idaho, Nevada, Oregon, Utah, and Wyoming.

*157. Underground water in the valleys of Utah Lake and Jordan River, Utah, by G. B. Richardson. 1906. 81 pp., 9 pls. 20c.

Discusses the source, distribution, recovery, and quality of waters; contains list of typical wells.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

Gives estimates of flood flow and frequency of Bear River at Collinston, Utah, and Humboldt River at Golconda, Nev. (p. 85).

*181. Geology and water resources of Owens Valley, Cal., by W. T. Lee. 1906, 28 pp., 6 pls. 15c.

Discusses artesian conditions, utilization of ground waters by pumping and power plants, and undrained lakes as registers of climate. See also Water-Supply Paper 294.

*199. Underground water in Sanpete and central Sevier valleys, Utah, by G. B. Richardson. 1907. 63 pp., 6 pls. 25c.

Describes topography and geology of the area, the sources, distribution, recovery, and quality of the ground waters; presents tabulated data concerning springs and wells.

*217. Water resources of Beaver Valley, Utah, by W. T. Lee. 1908. 57 pp., 1 pl. 10c.

Describes possible development of surface and ground waters, and quality of waters; contains field assays of well water, and sanitary and other exact analyses.

*220. Geology and water resources of a portion of south-central Oregon, by G. A. Waring. 1908. 86 pp., 10 pls. 20c.

Describes the rocks, streams, lakes and lake valleys, deep and shallow wells, climate, soils, vegetation, industries, and reclamation projects in Lake County; gives analyses of soils and waters.

*224. Some desert watering places in southeastern California and southwestern Nevada, by W. C. Mendenhall. 1909. 98 pp., 4 pls. 20c.

Describes physical features of the Colorado and Mohave deserts and the Death Valley region, mineral resources and industrial development, climate, rivers, springs, and camping places; gives hints on desert traveling; describes main routes of travel, and gives details concerning the springs.

*225. Ground waters of the Indio region, California, with a sketch of the Colorado Desert, by W. C. Mendenhall. 1909. 56 pp., 12 pls. 20c.

Describes the structural features and deposits of the Colorado Desert, rainfall, and drainage, the origin, source, character, and development of ground waters; gives history of development of the Indio region, and discusses soils, crops, and cost of reclamation.

*231. Geology and water resources of the Harney Basin region, Oregon, by G. A. Waring. 1909. 93 pp., 5 pls. 25c.

Describes topography, climate, vegetation, settlements and industries, the rocks and their succession, lakes, springs, and streams, and artesian conditions; discusses conservation of water supply, temperature of ground waters, and well-drilling methods; describes in detail Harney, Catlow, Alvord, and Whitehorse basins, and Malheur River basin.

237. The quality of the surface waters of California, by Walton Van Winkle and F. M. Eaton. 1910. 142 pp., 1 pl. 20c.

Describes geography, climate, industrial development, and drainage, and gives results of mineral analyses of the river waters.

274. Some stream waters of the Western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.

Describes collection of samples, plan of analytical work and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of Carson, Truckee, and Owens rivers.

277. Ground water in Juab, Milliard, and Iron counties, Utah, by O. E. Meinzer. 1911. 162 pp., 5 pls. 25c.

Describes the physiographic features, geologic formations, and history, the rainfall, soil, vegetation, streams, and industrial development; discusses the occurrence of ground water in the bedrock and in unconsolidated sediments, artesian conditions and springs, the quality of the ground waters, irrigation, construction of wells, and watering places on routes of travel; describes in detail Juab Valley and Round, Little, Sage, Dog, and Fernow valleys, Tintic Valley and Tintic mining district, Pavant and Lower Beaver valleys, Old River Bed and Cherry Creek region, Drum and Swasey Wash region, Sevier Desert, Wah Wah Valley, Sevier Lake bottoms, White, Fish Springs, Snake, Parowan, and Rush Lake valleys, and Escalante Desert; analyses.

278. Water resources of Antelope Valley, Cal., by H. R. Johnson. 1911. 92 pp. 7 pls. 25c.

Describes topography, drainage, climate, physiography, and the water-bearing and non-water-bearing rocks of areas in Kern, Los Angeles, and San Bernardino counties; discusses the influence of rainfall on the surface and ground waters, the artesian water and nonartesian water, bedrock springs, chemical character (analyses, alkali, dissolved solids, hygienic conditions), fallacies as to origin and quantities of artesian water, and the present and future development of the underground supplies.

294. An intensive study of the water resources of a part of Owens Valley, Cal., by C. H. Lee. 1912. 135 pp., 30 pls. 55c.

Describes topography, drainage, and structure of the valley, and discusses precipitation, stream flow, evaporation, percolation, and ground waters; bibliography.

297. Gazetteer of surface waters of California, Pt. III: Pacific coast and Great Basin streams, by B. D. Wood. 1913. 244 pp. 20c.

Contains description of streams and lakes of the Great Basin in California.

*300. Water resources of California, Pt. III: Stream measurements in the Great Basin and Pacific coast river basins, by H. D. McGlashan and H. J. Dean. 1913. 956 pp., 4 pls. 55c.

Describes the general features of the Great Basin in California, the Great Basin lakes in California and Nevada and gives results of stream-flow investigations available up to September 30, 1912.

333. Ground water in Box Elder and Tooele counties, Utah, by Everett Carpenter. 1913. 90 pp., 2 pls. 10c.

338. Springs of California, by Gerald A. Waring. 1915. 410 pp., 13 pls. 60c.

Describes briefly the physical features of California, including the coast ranges, Great Central Valley, the lava-covered region, the Sierra Nevada, the southeastern desert, and faults; defines "mineral water" and "pure water"; discusses source and amount of substances in waters, degree of concentration of natural waters and their properties, and the therapeutic value, temperature, and classification of mineral waters. The springs are described under the headings "hot," "carbonated," "sulphur," "saline," "magnesic," "iron," "artesian," "large cold," and "minor perennial" springs.

350. Profile surveys in Bear River basin, Idaho, prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 6 pls. 10c.

Contains a brief description of Bear River basin and a list of the gaging stations that have been maintained and mentions publications containing the results of measurements of stream flow in the basin. The maps show not only the outlines of the river banks, the islands, the positions of rapids, falls, shoals, and existing dams, and the crossings of all ferries and roads but the contours of banks to an elevation high enough to indicate the possibility of using the stream for the development of power by low or medium heads.

363. Quality of the surface waters of Oregon, by Walton Van Winkle. 1914. 137 pp., 2 pls. 20c.

Gives the results of an investigation made in cooperation with the State of Oregon "to determine the chemical composition of the waters of said State for a period of 14 months from" July 1, 1911. Describes the natural features of Oregon, discusses water for domestic and industrial uses, purification of water, and gives the results of analyses of waters of streams tributary to the Pacific and of a number of those discharging into the Great Basin; gives an outline of the geological history of the Great Basin, and brief descriptions of the general features of the Harney, Warner Lakes, Alkali Lake, Christmas Lake, and Chewaucan basins.

364. Water analyses from the laboratory of the United States Geological Survey tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters of rivers, lakes, wells, and springs in Utah, Nevada, California, and Oregon, and of mine waters from Tintic, Utah, and Tonopah and Kimberly, Nev.

365. Ground water in southeastern Nevada, by Everett Carpenter. 1915. 86 pp. 5 pls. 15c.

Describes an area in Clark, Lincoln, White Pine, and Nye counties drained in part by streams tributary to Colorado River and in part by streams discharging into the Great Basin. Discusses stream, lake, and wind topography, vegetation, crops, and industrial development, rainfall, occurrence of water in bedrock and unconsolidated sediments, source and permanence of artesian waters, and character and distribution of springs; also the quality of waters for domestic use and for irrigation, and gives analyses. Gives details of water supply by areas in Las Vegas and Virgin river basins and the Great Basin. Gives information in regard to watering places on routes of travel.

370. Surface water supply of Oregon, 1878–1910, by F. F. Henshaw and H. J. Dean. 1915. 829 pp., 1 pl. 45c.

Contains information pertaining to the surface waters of Oregon collected by the United States Geological Survey and cooperating parties from 1878 to September 30, 1910.

*375. Contributions to the hydrology of the United States, 1915; Nathan C. Grover, chief hydraulic engineer. 1916. 181 pp., 19 pls. 15c. Contains:

(*d*) Ground water in Big Smoky Valley, Nev., by O. E. Meinzer, pp. 85–116, pls. 6–7. Describes a typical Nevada desert valley—a plain hemmed in by mountain ranges and underlain by porous rock waste eroded from these ranges and saturated with water discharged from them. This valley was selected for investigation not because it afforded exceptional opportunity for the utilization of ground waters, but because it was considered more or less typical of the undeveloped valleys of the State. Preliminary report. See 423.

420. Profile surveys along Henrys Fork, Idaho, and Logan River and Blacksmith Fork, Utah, prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 10 pls. 10c.

Contains a brief description of the general features of Logan River basin and a list of the gaging stations that have been maintained in the basin. The maps show not only the outlines of the river banks, the islands, the positions of rapids, falls, shoals, and existing dams, and the crossings of all ferries and roads, but the contours of banks to an elevation high enough to indicate the possibility of using the stream for the development of power by low or medium heads.

423. Geology and water resources of Big Smoky, Clayton, and Alkali Spring valleys, Nevada, by Oscar E. Meinzer. 1917. 167 pp., 15 pls. 30c.

Covers in detail the area described briefly in Water-Supply Paper 375 (*d*) and two small adjoining areas.

425. Contributions to the hydrology of the United States, 1917; N. C. Grover, chief hydraulic engineer. 1918. Contains:

(*d*) Ground water in Reese River basin and adjacent parts of Humboldt River basin, Nevada, by G. A. Waring.

ANNUAL REPORTS.

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers so marked, however, may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

*Third Annual Report of the United States Geological Survey, 1881–82, J. W. Powell, Director. 1883. xviii, 564 pp., 67 pls. $2.35. Contains:

*Sketch of the geological history of Lake Lahontan, by I. C. Russell, pp. 189–235, pls. 18–23. Describes the physical features of the Great Basin.

*Fourth Annual Report of the United States Geological survey, 1882–83, J. W. Powell, Director. 1884. xxxii, 473 pp., 85 pls. $1.65. Contains:

*A geological reconnaissance in southern Oregon, by I. C. Russell, pp. 431–464, pls. 83–85. Describes the interior drainage of southern Oregon; discusses the area, extent, quality of waters and recent changes in the existing lakes.

*Eighth Annual Report of the United States Geological Survey, 1886–87, J W. Powell, Director. 1889. 2 parts. *Part I, xix, 474, viii pp., pls. 76. $1.50. Contains:

*The Quaternary history of Mono Valley, Cal., by I. C. Russell, pp. 261–394, pls. 16–44. Describes the physiographic features and drainage of the Mono Lake basin, the sources of water supply of the present lake, including streams and springs, and discusses the chemical composition of the water and the fluctuations in lake level.

*Tenth Annual Report of the United States Geological Survey, 1888–89, J. W. Powell, Director. 1890. 2 parts. *Pt. II. Irrigation, viii, 123 pp. 35c.

Makes a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation; includes an account of the methods of topographic and hydraulic work, the segregation work on reservoir sites and irrigable lands, field and office methods, and brief descriptions of the topography of some of the river basins.

Eleventh Annual Report of the United States Geological Survey, 1889–90, J. W. Powell, Director. 1891. 2 parts. Pt. II. Irrigation, xiv, 395 pp., 30 plates and maps. $1.25. Contains:

*Hydrography, pp. 1–110. Discusses scope of work, methods of stream measurement, rain fall and evaporations, and describes the more important streams.

*Engineering, pp. 111–200. Defines the scope of the work and gives an account of the survey in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

*The arid lands, pp. 201–289. Includes statements of the Director to the House Committee on Irrigation and extracts from the constitutions of States relating to irrigation.

*Topography, pp. 291–343. Comprises reports of the topographic surveys in California, Nevada, Colorado, Idaho, Montana, and New Mexico, and a report on reservoir sites.

*Irrigation literature, pp. 345–388. Gives a list of books and pamphlets on irrigation and allied subjects, mainly contained in the library of the United States Geological Survey.

Twelfth Annual Report of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II. Irrigation, xviii, 576 pp. 93 pls. $2.00. Contains:

*Report upon the location and survey of reservoir sites during the fiscal year ending June 30, 1891, by A. H. Thompson, pp. 1–212, pls. 54–57. Describes reservoir sites in Carson River basin at Red Lake, Pleasant Valley, Mountain Bullion, Indian Pool, Heenan Lake, Silver King Valley, Wolf Creek, Dumonts Meadow, all in Alpine County, along Rush Creek, in Hulls Meadow on Little Truckee River, at Twin Valley on the North Fork of Prosser Creek, at Monument Peak, at Grass Lake, and at Hope Valley, in California, and on Truckee River, Nev.; for each reservoir sites gives the location, height of dam, are inclosed by contour, approximate contents of reservoir, position of irrigable lands and areas of segregated lands.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. Pt. III, Irrigation, xi, 486 pp., 77 pl. $1.85. Contains:

*Engineering results of irrigation survey, by H. M. Wilson, pp. 351–427, pls. 147–182. Describes Donner Lake, Independence Lake, and Webber Lake reservoirs, also Truckee canal in the Truckee River system, and Long Valley and Hope Valley reservoirs in the Carson River basin, Nev.

Report upon the location and survey of reservior sites during the fiscal year ending June 30, 1892, by A. H. Thompson, pp. 451–478. Describes Bear Lake reservoir site (Utah-Idaho), Silver Lake, Twin Lakes, and Marys Lake sites, and sites on Sanpitch, Sevier, East Fork of Sevier Otter Creek, Panquitch Lake, and at Blue Spring, Utah.

Sixteenth Annual Report of the United States Geological Survey, 1894–95, Charles D. Walcott, Director. 1896. (Pts. II, III, and IV, 1895.) 4 parts. *Pt. II. Papers of an economic character, xix, 598 pp., 43 pls. $1.25. Contains:

The public lands and their water supply, by F. H. Newell, pp. 457–533, pls. 34–39. Describes general character of the public lands, the lands disposed of (railroad lands grant, and swamp lands, and private miscellaneous entries), land reserved (Indian, forest, and military reservations), the vacant lands, and the rate of disposal of vacant lands; discusses the streams, wells, and reserviors as sources of water supply; gives details for each State.

Eighteenth Annual Report of the United States Geological Survey, 1896–97, Charles D. Walcott, Director. 1897. (Pts. II and III, 1898.) 5 parts in 6 vols. *Pt. IV, Hydrography, x, 756 pp., 102 pls. $1.75. Contains:

*Reservoirs for irrigation, by J. D. Schuyler, pp. 617–740, pls. 47–102. Discusses proposed Rock Creek reservoir in Humboldt River, Nev.; gives tables of reservoir capacities and areas; describes proposed reservoir of Antelope Valley Water Co., California, and on Rock Creek, Humboldt River basin, Nev.

Twentieth Annual Report of the United States Geological Survey, 1898–99, Charles D. Walcott, Director. 1899. (Pts, II. III, IV, V, and VII, 1900.) 7 parts in 8 vols., and separate case for maps with Pt. V. *Pt. V, Forest Reserves, xix, 498 pp., 159 pls., 8 maps in separate case. $2.80. Contains:

*The San Gabriel Forest Reserve, by J. B. Leiberg, pp. 411–428, pls. 143–146.
*The San Bernardino Forest Reserve, by J. B. Leiberg, pp. 429–454, pls. 147–153.
The San Jacinto Forest Reserve, by J. B. Leiberg, pp. 455–478, pls. 154–159.

Describes general topographic features of forest reserves and drainage, part of which is by streams tributary to the Pacific, and part by streams that are lost in the sands of the Mohave and other deserts.

MONOGRAPHS.

Monographs are of quarto size. They are not distributed free but may be obtained from the Geological Survey at the prices indicated. An asterisk (*) indicates that the Survey's stock of paper is exhausted.

I. Lake Bonneville, by G. K. Gilbert. 1890. xx, 438 pp., 51 pls., 1 map. $1.50.

Contains in the introduction a description of the Great Basin; describes the present lakes and their oscillations, and gives analyses of the waters of Great Salt Lake and of fresh waters in the Salt Lake Basin.

XI. Geological history of Lake Lahonton, a Quaternary lake of northwestern Nevada, by I. C. Russell. 1885. xiv, 288 pp., 46 pls. $1.75.

Contains descriptions of the present rivers and lakes; discusses the chemical deposits of the area and gives analysis showing the composition of the principal rivers and lakes of the Lahontan Basin.

PROFESSIONAL PAPERS.

Professional papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked with an asterisk may, however, be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Professional papers are of quarto size.

95. Shorter contributions to general geology, 1915; David White, chief geologist. 1916. 120 pp., 7 pls. 20c.

Issued also in separate chapters. The following paper relates in part to ground water:

*(*a*) The composition of muds from Columbus Marsh, Nev., by W. B. Hicks (pp. 1-11). Gives data in regard to shallow wells on Columbus Marsh.

BULLETINS.

An asterisk (*) indicates that the Geological Survey's stock of paper is exhausted. Many of the papers so marked may be purchased from the SUPERINTENDENT OF DOCUMENTS, Washington, D. C. Bulletins are of octavo size.

252. Preliminary report on the geology and water resources of central Oregon, by I. C. Russell 1905. 138 pp., 24 pls. 15c.

Describes a portion of the extreme northern part of the Great Basin and a part of the drainage area of Deschutes River and its principal tributary, Crooked River; gives an account of the topography, drainage, rainfall, and temperature, winds, and forests; describes the volcanic and sedimentary rock formations, and discusses, by counties, the geology and topography, the surface and underground waters; treats of artesian conditions in the Deschutes basin and makes suggestions concerning artesian well records.

*264. Record of deep well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veach. 1895. 106 pp. 10c.

Discusses the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to geologists; describes the general methods of work; gives tabulated records of wells in Utah.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Gives an account of progress in the collection of well records and samples; contains tabulated: records of wells in California, Idaho, Nevada, Oregon, and Utah; and detailed record of well at Salt Lake City, Utah. The well of which a detailed section is given was selected because it affords valuable stratigraphic information.

*540. Contributions to economic geology, 1912, Part I, Metals and nonmetals except fuel; David White, chief geologist. 1914. 563 pp., 11 pls. 45c.

Issued also in separate chapters. The following papers contain information on ground water.

*(*n*) Prospecting for potash in Death Valley, Cal., by H. S. Gale (pp. 407–415). Included detailed sections of five wells, 30 to 70 feet deep, with data in regard to their waters, practically all of which are salty, as is shown by the analyses given.

Potash tests at Columbus,Marsh, Nev., by H. S. Gale (pp. 422–427). Includes detailed sections of two wells, 32 and 82 feet deep, respectively, with data in regard to their waters, some of which are not salty.

*(*p*) Potash in western saline deposits, by J. H. Hance (pp. 457–469). Gives total solids in waters from various wells and springs in the drainage basins of Railroad Valley, Fourmile Flat and Dixie Salt Marsh, in Nevada, and the record of a 305-foot well at Adamana, Ariz.

GEOLOGIC FOLIOS.

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped. The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute the Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea level of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The artesian-water map shows the depth to underground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization of mineral resources.

The folios numbered from 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey building May 18, 1913, the stock of geologic folios was more or less damaged by fire and water, but 80 or 90 per cent of the folios are usable. They will be sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive, also to the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sell for 25 cents a copy, except that some folios which contain an unusually large amount of matter, sell for 50 cents a copy. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy. If 34 folios selling at 25 cents each (or their equivalent in higher-priced folios) are ordered at one time a discount of 40 per cent is allowed: $5.10 is the minimum amount accepted at this rate.

All folios contain descriptions of the drainage of the quadrangles.

*39. Truckee folio, California.

Describes the general and economic geology of an area extending westward and northward from Truckee Lake, drained by streams a part of which flow through Yuba and American rivers to the Sacramento, and part through Lake Tahoe to the Great Basin, discusses the topography and geology, and under "Economic geology" the mineral springs which occur abundantly throughout the area.

MISCELLANEOUS REPORTS.

Other Federal bureaus and State and other organizations have from time to time published reports relating to the water resources of various sections of the country. Notable among those pertaining to the Great Basin are the reports of the Reclamation Board, the State engineer and surveyor, the State Conservation Commission of California, the reports of the State engineers of Idaho, Oregon, Utah, and Wyoming, the biennial reports of the Bureau of Industry, Agriculture, and Irrigation of Nevada, and the annual reports of the United States Reclamation Service.

The following reports deserve special mention:

Oregon system of water titles, by John H. Lewis: Oregon State Engineer Bull. 2, 1912.

State and national water laws, with detailed statement of the Oregon system of water titles, by John H. Lewis, with a discussion by Messrs. Clarence T. Johnston and L. J. Conte: Am. Soc. Civil Eng. Trans., vol. 76, pp. 637–758, 1913.

Irrigation pumping in Nevada, etc., by Charles Norcross: Nevada Bureau of Industry, Agriculture, and Irrigation Bull. 8, 1913.

Report of irrigation investigations in Utah, under the direction of Elwood Mead: U. S. Dept. Agr. Office Exper. Sta. Bull. 124. 1903.

How to appropriate the public waters of the State of Nevada, compiled by W. M. Kearney, State engineer, 1911.

Requirements and regulations, including suggestions and instructions in relation to the appropriation, use, and measurement of water in the State of Nevada: State engineer of Nevada, 1912.

GEOLOGICAL SURVEY HYDROLOGIC REPORTS OF GENERAL INTEREST.

The following list comprises reports not readily classifiable by drainage basins and covering a wide range of hydrologic investigations:

WATER-SUPPLY PAPERS.

*1. Pumping water for irrigation, by D. M. Wilson. 1896. 57 pp., 9 pls.

Describes pumps and motive powers, windmills, water wheels, and various kinds of engines, also storage reservoirs to retain pumped water until needed for irrigation.

*3. Sewage irrigation, by G. W. Rafter. 1897. 100 pp., 4 pls. 10c. (See Water-Paper 22.)

Discusses methods of sewage disposal by intermittent filtration and by irrigation; describes utilization of sewage in Germany, England, and France, and sewage purification in the United States.

*8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls. 10c.

Gives results of experimental tests of windmills during the summer of 1896 in the vicinity of Garden, Kans.; describes instruments and methods and draws conclusions.

*14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood. 1898. 91 pp., 1 pl.

Discusses efficiency of pumps and water lifts of various types.

*20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls. 15c.

Includes tables and descriptions of wind wheels, compares wheels of several types, and discusses results.

*22. Sewage irrigation, Part II, by G. W. Rafter. 1899. 100 pp., 7 pls. 15c.

Gives résumé of Water-Supply Paper 3; discusses pollution of certain streams, experiments on purification of factory wastes in Massachusetts, value of commercial fertilizers, and describes American sewage-disposal plants by States; contains bibliography of publications relating to sewage utilization and disposal.

*41. The windmill; its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls. 5c.

*42. The windmill; its efficiency and economic use, Part II, by E. C. Murphy. 1901. 75 pp. (73–147), 2 pls. (15–16). 10c.

Nos. 41 and 42 give details of results of experimental tests with windmills of various types.

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

*56. Methods of stream measurement. 1901. 51 pp., 12 pls. 15c.

Describes the methods used by the Survey in 1901-2. See also Nos. 64, 94, and 95.

*64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls. (See No. 95.) 10c.

Describes methods of measuring velocity of water and of measuring and computing stream flow and compares results obtained with the different instruments and methods; describes also experiments and results at the Cornell University hydraulic laboratory. A second, enlarged, edition published as Water-Supply Paper 95.

*67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. 15c.

Discusses origin, depth, and amount of ground waters; permeability of rocks and porosity of soils; causes, rates, and laws of motions of ground water; surface and deep zones of flows, and recovery of water by open wells and artesian and deep wells; treats of the shape and position of the water table; gives simple methods of measuring yield of flowing well; describes artesian wells at Savannah, Ga.

72. Sewage-pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.

Defines "normal" and "polluted" waters and discusses the damage resulting from pollution.

*80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp. 10c.

Treats of measurements of rainfall and laws and measurements of stream flow; gives rainfall, run-off, and evaporation formulas; discusses effect of forests on rainfall and run-off.

87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls. 25c.

First edition was published in Part II of the Twelfth Annual Report.

93. Proceedings of first conference of engineers of Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. 25c. [Requests for this report should be addressed to the U. S. Reclamation Service.]

Contains the following papers of more or less general interest:
Limits of an irrigation project, by D. W. Ross.
Relation of Federal and State laws to irrigation, by Morris Bien.
Electrical transmission of power for pumping, by H. A. Storrs.
Correct design and stability of high masonry dams, by Geo. Y. Wisner.
Irrigation surveys and the use of the plane table, by J. B. Lippincott.
The use of alkaline waters for irrigation, by Thomas H. Means.

*94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls. 10c.

Gives instruction for field and office work relating to measurements of stream flow by current meters. See also No. 95.

*95. Accuracy of stream measurements (second, enlarged, edition), by E. C. Murphy. 1904. 169 pp., 6 pls.

Describes methods of measuring and computing stream flow and compares results derived from different instruments and methods. See also No. 94.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. (See No. 152.)

Explains the legal principles under which antipollution statutes become operative, quotes court decisions to show authority for various deductions, and classifies according to scope the statutes enacted in the different States.

110. Contributions to the hydrology of eastern United States., 1904 M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.

Contains the following reports of general interest. The scope of each paper is indicated by its title.

Description of underflow meter used in measuring the velocity and direction of underground water, by Charles S. Slichter.

The California or "stovepipe" method of well construction, by Charles S. Slichter.

Approximate methods of measuring the yield of flowing wells, by Charles S. Slichter.

Corrections necessary in accurate determinations of flow from vertical well casings, from notes furnished by A. N. Talbot.

Experiment relating to problems of well contamination at Quitman, Ga., by S. W. McCallie.

113. The disposal of strawboard and oil-well wastes, by R. L. Sackett and Isaiah Bowman. 1905. 52 pp., 4 pls. 5c.

The first paper discusses the pollution of streams by sewage and by trade wastes, describes the manufacture of strawboard, and gives results of various experiments in disposing of the waste. The second paper describes briefly the topography, drainage, and geology of the region about Marion, Ind., the contamination of rock wells and of streams by waste oil and brine.

*114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.

Contains report on "Occurrence of underground water," by M. L. Fuller, discussing sources, amount, and temperature of waters, permeability and storage capacity of rocks, water-bearing formations, recovery of water by springs, wells, and pumps, essential conditions of artesian flows, and general conditions affecting underground waters in eastern United States.

119. Index to the hydrographic progress reports of the United States Geological Survey, 1888 to 1903, by J. C. Hoyt and B. D. Wood. 1905. 253 pp. 15c.

Scope indicated by title.

120. Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879-1904, by M L. Fuller. 1905. 128 pp. 10c.

Scope indicated by title.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Defines and classifies underground waters, gives common-law rules relating to their use, and cites State legislative acts affecting them.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Discusses the capacity of sand to transmit water, describes measurements of underflow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal., and on Long Island, N. Y.; gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.

143. Experiments of steel-concrete pipes on a working scale, by J. H. Quinton, 1905. 61 pp., 4 pls. 5c.

Scope indicated by title.

145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls. 10c.

Contains brief reports of general interest as follows:

Drainage of ponds into drilled wells, by Robert E. Horton. Discusses efficiency, cost, and capacity of drainage wells, and gives statistics of such wells in southern Michigan.

Construction of so-called fountain and geyser springs, by Myron L. Fuller.

A convenient gage for determining low artesian heads, by Myron L. Fuller.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, Chief Engineer. 1905. 267 pp. 15c. [Inquiries concerning this report should be addressed to the U. S. Reclamation Service.]

Contains brief account of the organization of the hydrographic [water resources] branch and the Reclamation Service, reports of conferences and committees, circulars of instruction, and many brief reports on subjects closely related to reclamation, and a bibliography of technical papers by members of the service. Of the papers read at the conference those listed below (scope indicated by title) are of more or less general interest.

Proposed State code of water laws, by Morris Bien.
Power engineering applied to irrigation problems, by O. H. Ensign.
Estimates on tunneling in irrigation projects, by A. L. Fellows.
Collection of stream-gaging data, by N. C. Grover.
Diamond-drill methods, by G. A. Hammond.
Mean-velocity and area curves, by F. W. Hanna.
Importance of general hydrographic data concerning basins of streams gaged, by R. E. Horton.
Effect of aquatic vegetation on stream flow, by R. E. Horton.
Sanitary regulations governing construction camps, by M. O. Leighton.
Necessity of draining irrigated land, by Thos. H. Means.
Alkali soils, by Thos. H. Means.
Cost of stream-gaging work, by E. C. Murphy.
Equipment of a cable gaging station, by E. C. Murphy.
Silting of reservoirs, by W. M. Reed.
Farm-unit classification, by D. W. Ross.
Cost of power for pumping irrigating water, by H. A. Storrs.
Records of flow at current-meter gaging stations during the frozen season, by F. H. Tillinghast.

147. Destructive floods in United States in 1904, by E. C. Murphy and others. 1905. 206 pp., 18 pls. 15c.

Contains a brief account of "A method of computing cross-section area of waterways," including formulas for maximum discharge and areas of cross section.

*150. Weir experiments, coefficients, and formulas, by R. E. Horton. 1906. 189 pp., 38 pls. (See Water-Supply Paper 200.) 15c.

Scope indicated by title.

151. Field assay of water, by M. O. Leighton. 1905. 77 pp., 4 pls.

Discusses methods, instruments, and reagents used in determining turbidity, color, iron chlorides, and hardness in connection with the studies of the quality of water in various parts of the United States.

*152. A review of the laws forbidding pollution of inland waters in the United States. second edition, by E. B. Goodell. 1905. 149 pp. 10c.

Scope indicated by title.

*155. Fluctuations of the water level in wells, with special reference to Long Island, N. Y., by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuations due to rainfall and evaporation, barometric changes, temperature changes, changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, underground water developments, and to indeterminate causes.

*160. Underground water papers, 1906; M. L. Fuller, geologist in charge. 1906. 104 pp., 1 pl.

Gives account of work in 1905, lists publications relating to underground waters, and contains the following brief reports of general interest:

Significance of the term "artesian," by Myron L. Fuller.
Representation of wells and springs on maps, by Myron L. Fuller.
Total amount of free water in the earth's crust, by Myron L. Fuller.
Use of fluorescein in the study of underground waters, by R. B. Dole.
Problems of water contamination, by Isaiah Bowman.
Instances of improvement of water in wells, by Myron L. Fuller.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

*163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp. 15c.

Scope indicated by title.

*179. Prevention of stream pollution by distillery refuse, based on investigations at Lynchburg, Ohio, by Herman Stabler. 1906. 34 pp., 1 pl. 10c.

Describes grain distillation, treatment of slop, sources, character, and effects of effluents on streams; discusses filtration, precipitation, fermentation, and evaporation methods of disposal of wastes without pollution.

*180. Turbine water-wheel tests and power tables, by R. E. Horton. 1906. 134 pp., 2 pls. 20c.

Scope indicated by title.

*185. Investigations on the purification of Boston sewage, * * * with a history of the sewage-disposal problem, by C.-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.

Discusses composition, disposal, purification, and treatment of sewages and tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification in intermittent sand filtration and coarse material; gives bibliography.

*186. Stream pollution by acid-iron wastes, a report based on investigations made at Shelby, Ohio, by Herman Stabler. 1906. 36 pp., 1 pl.

Gives history of pollution by acid-iron wastes at Shelby, Ohio, and of resulting litigation discusses effect of acid-iron liquors on sewage purification processes, recovery of copperas from acid-iron wastes, and other processes for removal of pickling liquor.

*187. Determination of stream flow during the frozen season, by H. K. Barrows and R. E. Horton. 1907. 93 pp., 1 pl. 15c.

Scope indicated by title.

*189. The prevention of stream pollution by strawboard waste, by E. B. Phelps. 1906. 29 pp., 2 pls.

Describes manufacture of strawboard, present and proposed methods of disposal of waste liquors, laboratory investigations of precipitation and sedimentation, and field studies of; amounts and character of water used, raw material and finished product, and mechanical filtration.

*194. Pollution of Illinois and Mississippi rivers by Chicago sewage (a digest of the testimony taken in the case of the State of Missouri *v.* The State of Illinois and the Sanitary District of Chicago), by M. O. Leighton. 1907. 3639 pp., 2 pls.

Scope indicated by amplification of title.

*200. Weir experiments, coefficients, and formulas (revision of paper No. 150), by R. E. Horton. 1907. 195 pp., 38 pls. 35c.

Scope indicated by title.

*226. The pollution of streams by sulphite-pulp waste, a study of possible remedies, by E. B. Phelps. 1909. 37 pp., 1 pl. 10c.

Describes manufacture of sulphite pulp, the waste liquors, and the experimental work leading to suggestions as to methods of preventing stream pollution.

*229. The disinfection of sewage and sewage filter effluents, with a chapter on the putrescibility and stability of sewage effluents, by E. B. Phelps. 1909. 91 pp., 1 pl. 15c.

Scope indicated by title.

*234. Papers on the conservation of water resources. 1909. 96 pp., 2 pls. 15c.

Contains the following papers, whose scope is indicated by their titles: Distribution of rainfall, by Henry Gannett; Floods, by M. O. Leighton; Developed water powers, compiled under the direction of W. M. Steuart, with discussion by M. O. Leighton; Undeveloped water powers, by M. O. Leighton; Irrigation, by F. H. Newell; Underground waters, by W. C. Mendenhal.: Denudation, by R. B. Dole and Herman Stabler; Control of catchment areas by H. N. Parker.

*235. The purification of some textile and other factory wastes, by Herman Stabler and G. H. Pratt. 1909. 76 pp. 10c.

Discusses waste waters from wool scouring, bleaching and dyeing cotton yarn, bleaching cotton piece goods, and manufacture of oleomargarine, fertilizer, and glue.

236. The quality of surface waters in the United States: Part I, Analyses of waters east of the one hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.

Describes collection of samples, methods of examination, preparation of solutions, accuracy of estimates and expression of analytical results.

238. The public utility of water powers and their governmental regulation, by René Tavernier and M. O. Leighton. 1910. 161 pp. 15c.

Discusses hydraulic power and irrigation, French, Italian, and Swiss legislation relative to the development of water powers, and laws proposed in the French Parliament; reviews work of bureau of hydraulics and agricultural improvement of the French department of agriculture, and gives résumé of Federal and State water-power legislation in the United States.

*255. Underground waters for farm use, by M. L. Fuller. 1910. 58 pp., 17 pls. 15c.

Discusses rocks as sources of water supply and the relative safety of supplies from different materials; springs and their protection; open or dug and deep wells, their location, yield, relative cost, protection, and safety; advantages and disadvantages of cisterns and combination wells and cisterns.

*257. Well-drilling methods, by Isaiah Bowman. 1911. 139 pp., 4 pls. 15c.

Discusses amount, distribution, and disposal of rainfall, water-bearing rocks, amount of ground water, artesian conditions, and oil and gas bearing formations; gives history of well drilling in Asia, Europe, and the United States; describes in detail the various methods and the machinery used; discusses loss of tools and geologic difficulties, contamination of well waters and methods of prevention, tests of capacity and measurement of depth, and costs of sinking wells.

*258. Underground water papers, 1910, by M. L. Fuller, F. G. Clapp, G. C. Matson, Samuel Sanford, and H. C. Wolff. 1911. 123 pp., 2 pls. 15c.

Contains the following papers (scope indicated by title) of general interest:
Drainage by wells, by M. L. Fuller.
Freezing of wells and related phenomena, by M. L. Fuller.
Pollution of underground waters in limestone, by G. C. Matson.
Protection of shallow wells in sandy deposits, by M. L. Fuller.
Magnetic wells, by M. L. Fuller.

*315. The purification of public water supplies, by G. A. Johnson. 1913. 84 pp., 8 pls. 10c.

Discusses ground, lake, and river waters as public supplies, development of water-works systems in the United States, water consumption, and typhoid fever; describes methods of filtration and sterilization of water, and municipal water softening.

334. The Ohio Valley flood of March-April, 1913 (including comparisons with some earlier floods), by A. H. Horton and H. J. Jackson. 1913. 96 pp., 22 pls. 20c.

Although relating specifically to floods in the Ohio Valley, this report discusses also the causes of floods and the prevention of damage by floods.

337. The effects of ice on stream flow, by William Glenn Hoyt. 1913. 77 pp., 7 pls. 15c.

Discusses methods of measuring the winter flow of streams.

*345. Contributions to the hydrology of the United States, 1914; N. C. Grover, chief hydraulic engineer. 1915. 225 pp., 17 pls. 30c. Contains:

*(*e*) A method of determining the daily discharge of rivers of variable slope, by M. R. Hall, W. E. Hall, and C. H. Pierce, pp. 53-65. Scope indicated by title.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clake, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters from rivers, lakes, wells, and springs in various parts of the United States, including analyses of the geyser water of Yellowstone National Park, hot Springs in Montana, brines from Death Valley, water from the Gulf of Mexico, and mine waters from Tennessee, Michigan, Missouri and Oklahoma, Montana, Colorado, and Utah. Nevada and Arizona, and California.

371. Equipment for current-meter gaging stations, by G. J. Lyon. 1915. 64 pp., 37 pls. 20c.

Describes methods of installing water-stage recorders and other gages and of constructing gage wells, shelters, structures for making discharge measurements, and artificial controls.

*375. Contributions to the hydrology of the United States, 1915; N. C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls. 15c.

Contains three papers presented at the conference of engineers of the water-resources branch in December, 1914, as follows:

*(*c*) Relation of stream gaging to the science of hydraulics, by C. H. Pierce and R. W. Davenport, pp. 77-84.

(*e*) A method for correcting river discharge for a changing stage, by B. E. Jones, pp. 117-130.

(*f*) Conditions requiring the use of automatic gages in obtaining records of stream flow, by C. H. Pierce, pp. 131-139.

*400. Contributions to the hydrology of the United States, 1916; N. C. Grover, chief hydraulic engineer. 1917. 108 pp., 7 pls. Contains:

(*a*) The people's interest in water-power resources, by G. O. Smith, pp. 1-8.
*(*c*) The measurement of silt-laden streams, by R. C. Pierce, pp. 39-51.
(*d*) Accuracy of stream-flow data, by N. C. Grover and J. C. Hoyt, pp. 53-59.

416. The divining rod, a history of water witching, with a bibliography, by Arthur J. Ellis. 1917. 59 pp. 10c.

A brief paper published "merely to furnish a reply to the numerous inquiries that are continually being received from all parts of the country" as to the efficacy of the divining rod for locating underground water.

425. Contributions to the hydrology of the United States, 1917; N. C. Grover, chief hydraulic engineer. 1918. Contains:

*(*c*) Hydraulic conversion tables and convenient equivalents, pp. 71-94. 1917.

427. Bibliography and index of the publications of the United States Geological Survey relating to ground water, by O. E. Meinzer. 1918. 169 pp., 1 pl.

Includes publications prepared, in whole or part, by the Geological Survey that treat any phase of the subject of ground water or any subject directly applicable to ground water. Illustrated by map showing reports that cover specific areas more or less thoroughly.

ANNUAL REPORTS.

*Fifth Annual Report of the United States Geological Survey, 1883-84, J. W. Powell, Director. 1885. xxxvi, 469 pp., 58 pls. $2.25. Contains:

*The requisite and qualifying conditions of artesian wells, by T. C. Chamberlin, pp. 125 to 173, pl. 21. Scope indicated by title.

Twelfth Annual Report of the United States Geological Survey, 1890-91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Irrigation in India, H. M. Wilson, pp. 363-561, pls. 107 to 146. See Water-Supply Paper 87.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III, Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*American irrigation engineering, by H. M. Wilson, pp. 101–349, pls. 111–145.

Discusses the economic aspects of irrigation, alkaline drainage, silt and sedimentation; gives brief history of legislation; describes perennial canals in Idaho, California, Wyoming, and Arizona; discusses water storage at reservoirs of the California and other projects, subsurface sources of supply, pumping, and subirrigation.

Fourteenth Annual Report of the United States Geological Survey, 1892–93, J. W. Powell, Director. 1893. (Pt. II, 1894.) 2 parts. *Pt. II, Accompanying papers, xx, 597 pp., 73 pls. $2.10. Contains:

*The potable waters of eastern United States, by W. J. McGee, pp. 1–47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

*Natural mineral waters of the United States, by A. C. Peale, pp. 49–88, pls. 3 and 4. Discusses the origin and flow of mineral springs, the source of mineralization, thermal springs, the chemical composition and analysis of spring waters, geographic distribution, and the utilization of mineral waters; gives a list of American mineral spring resorts; contains also some analyses.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Charles D. Walcott, Director. 1898. (Parts II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. II, Papers chiefly of a theoretic nature, v, 958 pp., 172 pls. $2.65. Contains:

*Principles and conditions of the movements of ground water, by F H. King, pp. 59–294, pls. 6–16. Discusses the amount of water stored in sandstone, in soil, and in other rocks, the depth to which ground water penetrates; gravitational, thermal, and capillary movements of ground waters, and the configuration of the ground-water surface; gives the results of experimental investigations on the flow of air and water through a rigid, porous medium, and through sands, sandstones, and silts; discusses results obtained by other investigators, and summarizes results of observations; discusses also rate of flow of water through sand and rock, the growth of rivers, rate of filtration through soil, interference of wells, etc.

*Theoretical investigation of the motion of ground waters, by C. S. Slichter, pp. 295–384, pl. 17. Scope indicated by title.

PROFESSIONAL PAPERS.

*72. Denudation and erosion in the southern Appalachian region and the Monongahela basin, by L. C. Glenn. 1911. 137 pp., 21 pls. 35c.

Describes the topography, geology, drainage, forests, climate, and population, and transportation facilities of the region, the relation of agriculture, lumbering, mining, and power development to erosion and denudation, and the nature, effects, and remedies of erosion; gives details of conditions in Holston, Nolichucky, French Broad, Little Tennessee, and Hiwassee river basins, along Tennessee River proper, and in the basins of the Coosa-Alabama system, Chattahoochee, Savannah, Saluda, Broad, Catawba, Yadkin, New, and Monongahela rivers.

86. The transportation of débris by running water, by G. K. Gilbert, based on experiments made with the assistance of E. C. Murphy. 1914. 263 pp., 3 pls. 70c.

The results of an investigation which was carried on in a specially equipped laboratory at Berkley, Cal., and was undertaken for the purpose of learning "the laws which control the movement of bed load and especially to determine how the quantity of load is related to the stream slope and discharge and to the degree of comminution of the débris."

A highly technical report.

105. Hydraulic-mining débris in the Sierra Nevada, by G. K. Gilbert. 154 pp., 34 pls. 1917. 50c.

Presents the results of an investigation undertaken by the United States Geological Survey in response to a memorial from the California Miners' Association asking that a particular study be made of portions of the Sacramento and San Joaquin valleys affected by detritus from torrential streams. The report deals largely with geologic and physiographic aspects of the subject, traces the physical effects, past and future, of the hydraulic mining of earlier decades, the similar effects which certain other industries induce through stimulation of the erosion of the soil, and the influence of the restriction of the area of inundation by the construction of levees. Suggests cooperation by several interests for the control of the streams now carrying heavy loads of débris.

BULLETINS.

*32. Lists and analyses of the mineral springs of the United States (a preliminary study), by A. C. Peale. 1886. 235 pp.

Defines mineral waters, lists the springs by States, and gives tables of analyses.

*319. Summary of the controlling factors of artesian flows, by M. L. Fuller. 1908, 44pp., 7 pls. 10c.

Describes underground reservoirs, the sources of ground waters, the confining agents, the primary and modifying factors of artesian circulation, the essential and modifying factors of artesian flow, and typical artesian systems.

*479. The geochemical interpretation of water analyses, by Chase Palmer. 1911. 31 pp. 5c.

Discusses the expression of chemical analyses, the chemical character of water, and the properties of natural waters; gives a classification of waters based on property values and reacting values, and discusses the character of the waters of certain rivers as interpreted directly from the results of analyses; discusses also the relation of water properties to geologic formations, silica in river water, and the character of the waters of the Mississippi and the Great Lakes and St. Lawrence River as indicated by chemical analyses.

616. The data of geochemistry (third edition), by F. W. Clarke. 1916. 821 pp. 45c.

Earlier editions were published as Bulletins 330 and 491. Contains a discussion of the statement and interpretation of water analyses and a chapter on "Mineral wells and springs" (pp. 179-216). Discusses the definition and classification of mineral waters, changes in the composition of water, deposits of calcareous, ocherous, and siliceous materials made by water, vadose and juvenile waters, and thermal springs in relation to volcanism. Describes the different kinds of ground water and gives typical analyses. Includes a brief bibliography of papers containing water analyses.

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[1] Many of the reports contain brief subject bibliographies. See abstracts.

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